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Resource Incentives for Return to Mexico for Older Mexicans with Diabetes in the United States

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Resource Incentives for Return to Mexico for Older Mexicans with Diabetes in the United States

by

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Dedication

This dissertation is dedicated in loving memory to my cousin Julie Sauvola.

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Resource Incentives for Return to Mexico for Older Mexicans with Diabetes in the United States

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Abstract: The purpose of this study is to evaluate the effects of family, health care, and economic resources on the relationship between diabetes and health in older Mexicans in the United States and Mexico. This investigation utilizes a mixed-methods approach in order to address the four research aims of this dissertation: first, to determine what familial, economic, and healthcare resources are available to older Mexicans with diabetes in the United States and Mexico; second, to establish the effect of familial, economic, and healthcare resources on the relationship between diabetic status and health in older Mexicans in Mexico and the United States; third, to determine if migration has an effect on the relationship between diabetic status and health in Mexico and the United States when taking into account familial and economic resources, as well as healthcare access; and finally, to establish if there is incentive for older Mexicans with diabetes to return to Mexico to care for their health. I conducted quantitative analysis using the

Mexican Health and Aging Survey, the Health and Retirement Survey, and The Hispanic Established Population of Epidemiologic Studies of the Elderly. In addition, I conducted in-depth interviews with Mexicans in Mexico who have diabetes and had previously migrated to the United States. Quantitative results demonstrate a health and mortality disadvantage for older Mexicans who live in the United States and Mexico. Resources had little to no effect on the relationship between diabetic status and health in the United States. Having resources did not have a positive impact in Mexico either; however, in certain cases Mexicans with diabetes were placed at a disadvantage without them. Economics had the largest effects and hold the largest incentive for return. Migrants who are able to tap economic resources from the United States are able to access the same resources as “better off” non-migrants, therefore giving them an advantage.

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Chapter 1: Introduction

1.1 Research Problem: Diabetes and the Epidemiological Paradox

Diabetes and its complications disproportionately affect Mexican Americans in the United States (Center for Disease Control 1999; Burke et. al. 1999). Although Mexican Americans have a greater propensity to develop diabetes and are at greater risk of living in poverty than their Anglo-white counterparts (Mendelson, Aronow, and Ahn 1998), these factors do not put them at an increased risk of mortality (Winkleby et. al. 1998). This phenomenon runs counter to what we know about the relationship between health, mortality, and poverty (Kitigawa and Hauser 1973; Pappas et. al. 1993) and thus has presented itself to the social-scientific community as an "epidemiological paradox" (e.g., Guendelman 1998; Markides and Coreil 1986; Scribner 1996**;** Council on Scientific Affairs 1991; Liao et. al. 1998).

1.1.1 Diabetes, Morbidity, and Mortality in the Mexican Descent Population in the United States and Mexico

The "epidemiological paradox" is perplexing when we consider the disproportionate number of Mexican Americans who have diabetes, which is a known risk factor for many life-threatening chronic conditions such as heart disease or end-stage renal disease (Center for Disease Control 2005). Nationally, approximately 7 percent of the total adult population has been told by a medical professional that they have diabetes (Center for Disease Control 2005), but for Mexican Americans estimates range from about 10 to 20 percent nationally (Otiniano 1997; Harris et. al. 1998; Tovar and Jimenez

2004), with as many as 50 percent suffering from diabetes in some Texas counties with high concentrations of Mexican Americans (Hanis et. al. 1983).

Compliance with the strict medical regime for the control of diabetes is essential if the more serious consequences of the disease are to be avoided. Yet older Mexican Americans with the disease frequently face the challenge of not having healthcare coverage or a regular medical provider (Villarejo 2003). As documented in Table 1.1, Mexican Americans are much less likely than Anglo-whites to have any usual source of health care. Moreover, Mexican Americans are also less likely to have been to a doctor in the past year. This trend is steadily increasing for Mexican Americans, while for Anglo-whites it is on the decline (Table 1.1). This inaccessibility or non-compliance to health care has its consequences in that Mexican Americans with diabetes are more likely to require amputations of the lower extremities due to Peripheral Vascular Disease than any other ethnic group (Kuo et. al. 2003; Harris 1999; Lavery et. al. 2003; Lavery et. al. 1999).

Despite the fact that Mexican Americans have a greater propensity to have diabetes and suffer from its complications, however, they demonstrate lower mortality rates for diseases related to diabetes (Winkleby et. al. 1998). This trend sends us searching for explanations for this illogical pattern and most often brings us to migration. Either Mexicans in the United States have an advantage because of selection (Kesterbaum 1986), or they return to Mexico when their health begins to decline, thus affecting the final counts of mortality (Paloni and Morenoff 2001). Traditionally, the focus of the research with respect to Mexican Americans' health and mortality has been

in the United States, and we have spent little time looking to Mexico for answers. If our best guess at why Mexican Americans in the United States have this health advantage is some effect of migration, and we cannot find answers here in the United States, then it stands to reason that we should extend our investigations into Mexico in order to understand this unusual phenomenon.

In Mexico, diabetes and its associated complications are the most prevalent cause of death, and mortality from diabetes is on the rise (Barquera et. al. 2003). Some studies have demonstrated that the progression of diabetes is similar in Mexico and the United States. For example, as in the United States, persons with diabetes are more likely to have hypertension and to be overweight (Aguilar-Salinas et. al. 2003). In addition, in a sample of persons 65 years and older in Mexico City, persons with diabetes were more likely to have cardiovascular disease and die from myocardial infarctions and cancer (Rodríguez-Saldaña et. al. 2002). Persons with diabetes were more likely to be functionally impaired and at increased risk of peripheral circulatory disease (Buitrón-Granados 2004). Finally, researchers have found Mexico to have the highest rates internationally of metabolic syndrome, a key factor in the progression of other diseases related to diabetes (Aguilar-Salinas et. al. 2003).

When comparing Mexican adults, age 35 to 64, from Mexico (Mexico City) and the United States (San Antonio), however, one study found that Mexicans residing in Texas had a greater likelihood of having diabetes, higher Body Mass Index scores, and greater fat intake than their Mexico-residing counterparts (Stern et. al. 1992). Mexicans

in Mexico with diabetes may have better health habits than their peers in Texas, but relative to international standards they are at a disadvantage.

The literature in the United States and Mexico demonstrates that the relationship between diabetes, health, and mortality outcomes is complicated. On the one hand, Mexicans in Mexico have a higher rate of diabetic death than their peers of all races in the United States. On the other, they are equally likely to have co-morbidities associated with diabetes, despite better health habits. One way we can approach these findings is to agree with the idea that Mexicans return to Mexico when they become sick, thus deflating the diabetes-related death rate in this population in the United States. Another is to ask: if there is no difference with respect to co-morbidities, why would anyone go back?

1.1.2 Theories on the Epidemiological Paradox and Migration

1.1.2.1 The Epidemiological Paradox

In order to make sense of the "paradox" two primary theories have evolved through many years of research (Markides and Coreil 1986). First is the assertion that people who migrate are simply healthier. Even though Mexican immigrants may have an increased propensity to have diabetes, they have better outcomes due to the fact that they were selected for migration because of superior health status (Palloni and Morenoff 2001). Kesterbaum (1986) first documented the selection effect in all immigrants by using National Center for Health Statistic data cross-matched with Census data. Using other sources of data (i.e. NHIS and NLMS linked with the NDI), researchers have found the same results regardless of country of origin: immigrants in the United States continue

to have better health and mortality profiles than their U.S.-born peers (Sorlie et. al. 1993; Hummer et. al. 1999; Singh and Siahpush 2001; Singh and Siahpush 2002).

Other researchers have found, however, that when comparing U.S.-born Mexican Americans to Mexican-born Mexicans, there is a statistically significant difference between whites for both groups, but not between the two Mexican-origin groups in cardiovascular mortality risks, thus calling into question the selection-effect argument (Mitchell, Stern, Haffner, Hazuda, and Patterson 1990). Furthermore, although there has been speculation about genetic health benefits, research has generated no strong support for a Mexican-American advantage (Tortolero, Goff, Nichaman, Labarthe, Grunbaum, and Hanis 1997; Wei, Valdez, Mitchell, Haffner, Stern, and Hazuda 1996; Mitchell et al. 1996).

The San Antonio Heart Study, a longitudinal study of cardiovascular health and risk, has also found conflicting results with respect to cardiovascular death and the "healthy migrant" theory (Wei et. al. 1996). Monitoring a cohort of Mexican Americans and Non-Hispanic whites' mortality rates over time, the study observed no significant difference in mortality or risk factors associated with cardiovascular disease.

Since there are such conflicting reports on the selection-advantage hypothesis specific to the Mexican-American population, the "salmon bias" effect has emerged as an alternative explanation (Abraído et al. 1999). This theory explains the health advantage of Mexican Americans as a result of return migration of sick Mexican immigrants to Mexico. Results from previous studies have been mixed with respect to this theory. For example, Abraído et al. (1999), using the National Longitudinal Mortality Survey

(NLMS) linked to the National Death Index (NDI), did not find evidence to support the return-migration theory. Using only the Mexican Health and Aging Survey (MHAS), Palloni and Arias (2004) found an association between returning to Mexico from the United States and self-reported health and mortality. Furthermore, Patel et. al. (2004) present a convincing argument in support of the "salmon bias," using NHIS (National Health Interview Survey) data linked to the NDI and the Hispanic Established Population of Epidemiologic Studies of the Elderly (EPESE).

The two primary explanations for the epidemiological paradox pose questions about the role migration plays in the general health of the Mexican-descent population in this country. Is it a matter of health behaviors and immigrant health advantage or the return of sick immigrants to Mexico? We have spent a great deal of time and effort trying to solve this dilemma on the United States side of the border, but have spent little effort looking at the problem from the perspective of Mexico. In addition, we have spent little time considering what resources motivate return to Mexico.

1.1.2.2 Migration, Resources, and Health

Mexicans come to the United States from Mexico in search of economic resources to improve the financial well-being for themselves and their families (Massey et. al. 1994; Portes 1997; Kandel and Massey 2002; Palloni et. al 2001). Some periodically return to Mexico, while others decide to stay and raise their families in the United States (Massey, Goldring, and Durand 1994). Whether an individual chooses to stay in the United States permanently or return seasonally depends largely on what type of resources are available in the United States and back home in terms of location of family, social

networks, or economic resources (Lindstrom 1996; Reagan and Olsen 2000; Palloni et. al. 2001).

Traditionally, with respect to health in the United States, researchers have studied migration status in terms of nativity, number of years lived in this country, or level of acculturation to the mainstream (Hummer, Rogers, Nam and, LeClere 1999). These have also been the most common approaches to investigating the Mexican-American epidemiological paradox. The problem with this methodology is that Mexicans who choose to reside in the United States permanently represent only part of the total number of people who migrate from Mexico. Therefore, when we look at the relationship between migration and health of Mexican Americans, we are only able to understand the relationship with respect to permanent immigrants to the United States.

Many Mexicans who migrate spend short periods of time in the United States, but may migrate for many years. Although they are not permanent in this country, they may have the same level of exposure to the mainstream culture or work hazards in the United States as many Mexicans who choose to reside long-term. Additionally, later-life immigrants may potentially differ significantly from those who arrived in this country as children or young adults (Angel, Angel, and Markides 2000). Moreover, we do not know how short-term migrants who spent short periods of time in the United States and return to Mexico compare to permanent residents in the United States or even to their non-migrant counterparts in Mexico.

1.1.2.3 Aging, Health, and Migration

Health and functional independence are among the most important factors for internal migration of the elderly in this country (DeJong, Wilmoth, Angel, and Cornwell 1995; Findley 1988). Significantly, preparation for aging or anticipated need for assistance or resources is associated with moves of the unmarried and less healthy older Americans (Meyer and Speare 1985). For example, elderly with severe disabilities have been found to be more likely to move from areas that have fewer nursing home beds (Walters 2002). Additionally, older adults who experienced short-term changes in ADL and IADL status are more likely to move for health reasons (Chen and Wilmoth 2004). Other research suggests that decline in health is not a precipitant for migration but rather something that occurs after the fact (Findley 1988). In terms of Mexicans, as health deteriorates, immigrants may assess which types of social, familial, and economic resources they have in the United States and utilize strategies to manage their illness which may also include returning to Mexico. Or, they may choose to return to Mexico to retire and develop health problems after the fact.

1.2 Statement of the Problem

Palloni and Morenoff (2001) state that one of the primary reasons for our inability to solve the paradox is our failure to take on different approaches in research to address this scientific enigma. The majority of the work that has been done to date that has demonstrated a Mexican-American paradox utilized large-scale datasets from the United States (Sorlie et. al. 1993; Hummer et. al. 1999; Singh and Siahpush 2001; Singh and Siahpush 2002; Elo, Turra, Kesterbaum, and Ferguson 2004; Arias and Palloni 2004; Patel et. al. 2004) In terms of this methodology there appears to be a solid pattern of a

Mexican-American health advantage, but as noted in by Palloni and Morenoff (2001) and Patel et. al. (2004), although there seems to be a trend, little has been done to explicate it.

Some have suggested that Mexicans return to Mexico when they become ill (Palloni and Arias 2004). Others suggest that there are problems with tracking the deaths of Mexican immigrants due to issues with name and social security number registration (Palloni and Morenoff 2001; Patel et. al. 2004). Regardless of theory, using large-scale death indices from the United States exclusively to explain the epidemiological paradox is inadequate since we cannot attempt address why or how Mexican Americans have a mortality health advantage.

Another major drawback to the research on the epidemiological paradox is the fact that, previously, researchers have only looked at the health of Mexicans in the United States and not comparatively with those residing in Mexico. We do not know how Mexican-origin individuals in the United States compare to their counterparts in Mexico or how migrants living in Mexico compare to those in the United States. Many unanswered questions still remain.

Little attempt has been made to track the disease process that leads to death, which might reveal how Mexicans attend to their illnesses, such as diabetes, before they die. If there is an overrepresentation of Mexicans living in the United States with diabetes, what resources benefit them and why might they return to Mexico?

1.3 Research Aims

This study is designed to address the following research aims:

1. To determine what familial, economic, and healthcare resources are available to older Mexicans with diabetes in the United States and Mexico.
2. To establish the effect of familial, economic, and healthcare resources on the relationship between diabetic status and health in older Mexicans in Mexico and the United States.
3. To determine if migration has an effect on the relationship between diabetic status and health in Mexico and the United States when taking into account familial and economic resources, as well as healthcare access.
4. To establish if there is incentive for older Mexicans with diabetes to return to Mexico to care for their health.

1.4 Summary of Study Design

This study will address some of the inadequacies of the current literature on the Mexican-American epidemiological paradox, migration, and health by integrating quantitative and qualitative methods to address the research aims of this project. Using a combined method of research enables me to utilize large datasets, as previous studies have done, but also to contextualize my results within perceptions and experiences of individuals living in migrant communities in Mexico.

In addition to employing combined scientific methods, this study is comparative, using data from the United States and Mexico. Previous research has been limited by the lack of such data; however, this study utilizes the Hispanic Established Population of Epidemiologic Studies of the Elderly (Hispanic EPESE) from the United States and the

Mexican Health and Aging Survey (MHAS) from Mexico. These two datasets were not originally designed for comparison, but they are extremely complementary with respect to variable ease of use and question design.

This study will also investigate the moderating effects of family resources, health care, and economics on the relationship between diabetic status and health. A vast amount of research has been done with respect to the migration of the sick, older adults and resource access in the United States (DeJong, Wilmoth, Angel, and Cornwell 1995; Findley 1988; Walters 2002; Chen and Wilmoth 2004), yet beyond simple economic or demographic variables such as income or educational attainment, access to sources of support to promote health or prolong life have been overlooked in studies of the relationship between migration and health of older Mexicans in terms of the epidemiological paradox.

Furthermore, rather than focusing on one aspect of health, this study uses three outcome variables: self-assessed health, functional status, and death. I have found variation with respect to self-rated physiological health and actual health among Hispanics (Markides, Black, Ostir, Angel, Guralnik, and Lichtenstein 2001; Angel, Frisco, Angel, Chiriboga 2003). Using multiple dimensions of health will allow for a better, more complete understanding of the relationship between health and migration among Mexicans. Finally, focusing on a chronic disease that is associated with other life-terminating diseases and is highly prevalent among Mexicans in both the United States and Mexico will shed light on the epidemiological paradox by demonstrating which resources are pivotal in the progression of a chronic disease like diabetes.

1.5 Outline of Dissertation

The analysis for this dissertation is presented in four separate chapters. Three chapters are dedicated to the quantitative analysis; the fourth presents the findings from the qualitative research. The analysis for each quantitative chapter utilizes the Mexican Health and Aging Survey (MHAS–Mexico) and the Hispanic Established Population of Epidemiologic Studies of the Elderly (Hispanic EPESE–United States). Because each chapter will address a separate individual moderating variable, each chapter will begin with a literature review relevant to that analysis. Chapter 2 will present quantitative analysis using marital status and family support as moderating variables. I will first present descriptive statistics on medication use, control of diabetes, diabetes diet, and body mass index for both marital status and family support. I will then display outcomes for logistic regressions, focusing first on marital status and family support and then taking into account migration status.

Chapter 3 is a report of quantitative analysis using healthcare coverage as the moderating variable of interest. As in Chapter 2, I will first present descriptive statistics for diabetes medication, diabetes control, diabetes diet, and body mass index. This presentation will be followed by results from the logistic regression analysis. Chapter 4 will give an account of the data analysis for economic resources. This analysis will utilize as the principle moderating variables employment status, income, and type of dwelling subjects live in. Again, I will present descriptive statistics, as well as results for a logistic regression analysis. Finally, the fifth chapter will be an account of the qualitative investigation that I conducted in Michoacán, Mexico, outside of Zamora. This chapter is

descriptive and will tie together the previous chapters through contextualization of some of the significant trends in the quantitative analysis.

Table 1.1 Health Treatment Indicators for Mexican Americans versus Anglo-whites Diabetes and Risk Factor Statistics

Health Treatment Indicators	Mexican			Anglo-whites		
Healthcare Visits to Medical Professional (MD office, ER, etc)	**1997**	**1999**	**2001**	**1997**	**1999**	**2001**
None	28.9	30.2	31.4	14.7	15.5	14.3
1-3	40.8	43.0	39.2	46.6	46.0	46.4
4-9	18.5	18.2	19.6	24.4	24.5	25.4
10 or more visits	11.8	8.7	9.8	14.3	14.1	13.9
No Usual Source of Health Care among Adults 18-64	**1996**	**2000**	**2001**	**1996**	**2000**	**2001**
	28.1	33.7	34.6	15.0	15.2	13.9

** Source: National Center for Health Statistics 2004

Chapter 2: No Hay Nada Como Familia—Marital Status and Family Resources

2.1 Introduction

The Mexican family is said to be protective of the health and of its members in three ways: First, some believe it reduces the propensity to take on negative health behaviors such as smoking (Lee and Markides 1991), thus reducing the risk of associated health problems. Second, it offers a greater level of support than other ethnic groups (Angel, Angel, and Markides 2000), which in turn buffers its members from the harmful effects of the stress of living in poverty or in a culture of discrimination (Finch, Hummer, Kolody, and Vega 2001). Finally, the Mexican family may serve as an incentive for return to Mexico when illness arises for its members in the United States, who are in search of assistance or emotional support that may be lacking in this country (Palloni and Arias 2004; Aguilera 2004). Whatever the case may be, the salubrious effects of the Mexican-American family has become increasingly popular as an explanation for the "epidemiological paradox," since it is difficult to fathom how Mexicans living in the United States can have such favorable health and mortality profiles given their disadvantaged socioeconomic circumstances (Mendelson, Aronow, and Ahn 1998).

Focusing on family support and marital status, this chapter will examine the effects of family resources on diabetes health. Using the Hispanic EPESE from the United States and the MHAS from Mexico, I will make comparisons in terms of self-assessed health, functional status, and mortality. Analysis will reveal if variations exist between countries and if older Mexicans with diabetes may benefit from family resources

or being married in one country over the other. Ultimately, this chapter, as with the subsequent quantitative chapters, will demonstrate trends in the effects of resources on the relationship between diabetes status and health in order to build a case for or against return migration to Mexico.

2.2 Background

2.2.1 The Family as a Resource for When Mexicans Age

Families are usually the first to be called upon to care for our nation's sick and elderly; tasks like providing transportation to doctors' appointments and monitoring medication administration usually fall on family members (Zunker, Rutt, and Meza 2005; Evandrou and Glaser 2004; Johnson, Gallagher, and Wolinsky 2004; Fast, Keating, Otfinowski and Derksen 2004). This is frequently the case due to their physical availability, their free-of-charge resources, and the preference for asking for help someone who is familiar rather than a complete stranger. For the older Mexican American, systematic barriers in the healthcare system also create challenges in accessing outside resources, thus making family members an even more essential player in the management of a chronic disease such as diabetes (Wilmoth 2001; Angel, Angel, and Markides 2000).

Documented benefits of family resource access have been demonstrated with two other chronic diseases: HIV and asthma. First, in one study looking at family support and medication compliance in Latinos with HIV and AIDS, van Servellen and Lombardi (2005) found that patients who had family or members in their community available to

talk to about their problems and receive information about their illness were more likely to follow correct dosages prescribed by their physicians. In another example using children with asthma, Bauman et. al. (2002) found that those children with caretakers who were less compliant with medications and allergen reduction measures (i.e. covers on mattresses, etc.) had worse overall management of their disease and spent more days hospitalized than their compliant counterparts. Both studies demonstrate that family and caretakers play an important role in the successful management of chronic illness. Therefore, in an environment where other resources may be lacking, as with older Mexican Americans, this resource may have the capacity to offset the disadvantage this group faces.

2.2.2 The Draw of "La Familia" to Mexico

Although we know older Mexicans in this country rely more on their families than other ethnic groups, there is still little information on the role the Mexican family plays as an incentive to returning to Mexico when they become ill. For that reason I must look to the literature on the migration of the general older American population in their retirement years in order to speculate about this role. The best-known group of migrating seniors in the United States has sometimes been referred to as "snowbirds" (Coates, Healy and Morrison 2002). The "snowbirds" are a group of older retired persons who travel to the warm and sunny states of the South every winter to avoid the harsh, cold weather of the North. Researchers have observed that when illness strikes, these retirees often return to their northern places of origin to utilize assistance offered by their families

(Liaw, Frey, and Lin 2002; Stoller and Lingino 2001). In fact, these retirees are less likely to move to another state permanently if family ties still exist in their place of origin (McHugh 1990).

For older Mexicans living in the United States, not having legal residency often precludes them from accessing health and social services, since these services are offered predominantly by state and federal funding, require resident status for qualification (Angel, Angel, and Markides 2000). This problem may force Mexican Americans to rely on their families to a greater extent than other ethnic groups. This greater reliance on the family makes the idea of return migration to Mexico, if family ties still exist there, very appealing to the "snowbirds." In fact, some evidence suggests that Mexican immigrants will return to Mexico if there are siblings who still live in their communities of origin (Aguilera 2004).

2.3 Research Objectives

Older Americans of Mexican descent may benefit from the emotional and logistical support of their families, thus protecting them from the negative effects of illness and later from premature mortality associated with their socioeconomic status. If familial resources have health benefits for older Mexicans, then in this study we should see a moderating effect on the relationship between diabetes status and the health outcomes. Moreover, if there is an effect that can be observed in the United States, then it could stand to reason that there would be a potential incentive to stay in the United States rather than return to Mexico for persons with diabetes.

When family is not present in the United States, in order to avoid the potential negative consequences, older Mexicans may return to Mexico in search of family members in their place of origin. If there is a motivation to return in search of familial resources for older Mexicans with diabetes in the United States, then there must be a health benefit for diabetics that will be observed in Mexico in this analysis. Additionally, there should be no benefit or disadvantage of having familial resources for older Mexicans with diabetes in the United States.

This chapter will compare the effects of family resources and marital status on the relationship between diabetes health and self-assessed health, functional status, and mortality in older Mexicans living in the United States and Mexico. I will attempt to determine first if Mexicans living in the United States and Mexico who have family assistance or are married have a better diabetes health profile. Next, I will determine if differences exist between the United States and Mexico for Mexicans with diabetes with respect to family support and marital status. Furthermore, after taking into consideration family support, I will demonstrate whether migration history affects diabetes status for older Mexicans in the United States or Mexico. In sum, this chapter attempts to define the relationship between family resources and health for older Mexicans with diabetes in order to begin the process of understanding why they might return to Mexico from the United States.

2.4 Data and Methods

2.4.1 Data

The data that I use for this chapter comes from the Mexican Health and Aging Survey (MHAS) and the Hispanic Established Population of Epidemiologic Studies of the Elderly (Hispanic EPESE). The Mexican Health and Aging Survey (MHAS) is a nationally representative panel survey of Mexicans aged 50 and over and their spouses in Mexico from the year 2000 (N=15,186; diabetics n = 2420). Participants were recruited in conjunction with the 2000 National Employment Survey/ Encuesta Nacional de Empleo (ENE). Representatives of the Instituto Nacional de Estadística, Geografía, e Informática (INEGI) in Mexico, conducted interviews in the respondents' homes. Respondents and their spouses answered questions regarding their demographic, health, family, and economic conditions, among other topics. A follow-up wave of interviews was conducted in 2003 with the individuals or a proxy respondent (N = 14,277). I will use individual level sample weights created by the principle investigators of the datasets for the entire statistical analysis using this dataset.

The Hispanic EPESE is a cohort longitudinal study of older Mexican Americans living in the Southwest. The sample was selected using probability design of elderly Mexicans living in Texas, Arizona, California, Colorado, and New Mexico. The original data was collected in 1993-1994 and was followed by three subsequent waves (1995-1996, 1998-1999, 2000-2001). If a respondent was not located in person due to death or relocation, proxy information about him or her was collected from family or friends. Follow-up rates are nearly 86% of the original sample of 3,050.

Since the Hispanic EPESE dataset's age distribution is quite old (i.e. 70 years and older), this study limits cases to those older than 69 years in the MHAS dataset. Because

of this limitation in age range and the attrition in subsequent waves, the final sample sizes for this analysis were 2,538 for the MHAS and 1,652 for the Hispanic EPESE. I will use individual level sample weights created by the principle investigators of the datasets for the entire statistical analysis using this dataset.

2.4.2 Variable Measurement

In order to present a more global picture of the moderating effects of family resources on diabetes health of Mexicans, I have used three dependent health measures: self-assessed health, functional status, and mortality. First, self-assessed health was originally constructed using a five-category scale, ranging from excellent (5) to poor (1). However, the Hispanic EPESE does not include a Very Good category, so I categorized Very Good with the Good category for the MHAS dataset to facilitate comparability. Furthermore, the low case frequency in the Excellent and Good groups required me to collapse the categories even further into three. The final variable, therefore, was Excellent/Very Good/Good, Fair, and Poor. Other researchers have used similar methods without compromising the reliability of the results (Cho, Frisbie, and Hummer 2004). I then created a dummy variable in which Excellent/Very Good/ Good serves as the reference category.

This study measures functional status by an index of questions related to ability to perform personal care or Activities of Daily Living (ADLs). Subjects were asked whether or not they had difficulty performing daily personal-care tasks (such as bathing). Five of the questions on each survey were comparable (yes = 1 /no = 0). The Hispanic EPESE

dataset had an extra category called “grooming” that was not on the MHAS. I dropped this category to make the ADL variable comparable to the other dataset. I then summed up the total number of “yes” responses and assigned a value ranging from 0 to 5 to each subject, with higher score indicating more assistance needed. Because of the small range of numerical values for this variable and the fact that less than five percent of the subjects reported a score higher than three on both datasets, I used the categories of zero, one to two, and three or more. Finally, I created a mortality variable based on whether the subject was deceased (yes= 1) by the subsequent wave.

Family resources were measured as family support and marital status. For family support, the response options were “yes” or “no” and therefore the variable was coded binomially for the analysis (yes = 1). Marital status is measured as married/cohabiting, separated/divorced, widowed, and never married. I feel this method of categorization best illustrates the effects such relationships may have on diabetic health. First, actively living with a romantic partner produces similar benefits whether the couple is married or just cohabitating. Being divorced, separated, or widowed also constitute a similar status: having once lived with a romantic partner, but being out of the relationship. Finally, someone who has never married has never experienced either living with their romantic partner or the transition of living without. Arguably, there are exceptions to each category; however, I felt that this was the best way to group respondents together without having an overabundance of categories to convolute the analysis. I thus created dummy variables, with married/cohabitating serving as the reference category.

In order to evaluate the relationship between diabetes health and family support and marital status, I generated descriptive statistics, using certain aspects of diabetes management and health status, such as diabetes status, use of oral glucose-control medication, use of insulin injections, Body Mass Index (BMI), level of control over the diabetes, and adherence to a diabetes diet, to test further the severity of the subjects' illness. I coded diabetes as a simple dichotomous variable (yes = 1). I was unable to distinguish between Type 1 and Type 2 diabetes from the variables that were available for analysis, which may create some bias in the findings. However, since the majority of adults in the United States have Type 2 (American Diabetes Association 2000) and it is unlikely that those who developed diabetes in childhood would survive to be older that sixty-nine, I make the assumption that the majority of subjects in these datasets developed diabetes as adults (i.e. Type 2). With respect to the oral glucose-control medication and insulin question on the Hispanic EPESE survey, one question asked if subjects were taking insulin, diabetes medication, or both. I coded insulin as 1 if they were taking only insulin or if they were taking both, and coded diabetes medication only if they answered yes to diabetes medication but not both. Therefore, I established the variable as insulin or both in order to make it comparable to the Mexican dataset. In Mexico, the question asked if persons were taking insulin or oral glucose-control medication; therefore, I created two separate categories as such.

I calculated body Mass Index (BMI) by creating a ratio of subjects' self-reported weight to their height for each country in its respective measurement system (i.e. kilograms versus pounds). I then divided respondents' BMI into five categories:

underweight (BMI <19), normal weight (19<BMI<25), overweight (24<BMI<30), obese (29<BMI<40), and extremely obese (BMI>39). Finally, for the Hispanic EPESE dataset, I calculated BMI using averages for missing values, substituting missing values at Time 1 with averages taken from two times periods that were available for weight and height. I measured diet dichotomously according to whether subjects follow a special diet for their diabetes (yes = 1), and if subjects' diabetes was under control, I also measured dichotomously.

My analysis is limited to the U.S.-born and Mexico-born and, in terms of migration, uses history of migration, years lived in the United States, and years since returning to Mexico (for the Mexico sample). In Mexico, years lived in the United States are coded as none, 10 years or less, or more than 10 years. In the multivariate analysis of the MHAS data using the functional status variables, I had to collapse categories for the years since returning variable, due to low cell size counts, to preserve the reliability of the results. This reduction resulted in three categories: never, more than 20 years, and 20 years or less. Although twenty years is a long period of time and limitations do exist with respect to interpretation, I felt that including such a variable in the model was better than completely eliminating it. In the United States, I categorized migration as U.S.-born, 20 years or less, 21 to 40 years, 41 to 60 years, and 61 years or more.

To account for the confounding effects of the major explanatory variable with the primary demographic characteristics of the samples, I utilized standard controls (i.e. sex, level of education, and age) and categorized age as 70–75, 76–80, and 81+. Level of

education is categorized as less than 7 years, seven to eleven years, twelve years, and more than twelve years, for the same reasons. Finally, I code gender as female = 1.

2.4.3 Analysis

In order to compare variation in family support and marital status that may exist among Mexicans with diabetes in the United States and Mexico, I ran cross tabulations based on diabetes diet, diabetes medication, control of diabetes, Body Mass Index, length of time spent in the United States and in Mexico, and years since returning. To determine the effects of family resources and marital status (net of demographic controls) on the relationship between self-rated health, functional status, and mortality and diabetes, I conducted multivariate analysis using logistic regression. Since the analysis is limited with respect to the number of waves collected for the MHAS data and the dependent variables are categorical, I used simple logistic regression rather than hazard or growth curve models. Statistical models, therefore, predicted self-assessed health and functional status at Time 2 (MHAS 2003; Hispanic EPESE 2001) by explanatory variables at Time One (MHAS 2001; Hispanic EPESE 1999).

To determine individual and full model effects on the dependent variable, I carried out a series of stepwise regressions, using each dependent variable at Time 2. Model 1 is the unadjusted model for diabetic status. Demographic controls are added in Model 2 in order to discount the possibility that the unadjusted effects are attributable to demographic variations that may exist between persons with diabetes and their counterparts. In the next two models I include marital status (Model 3) and family

support (Model 4) to establish if in fact having either of these resources impacts the relationship between diabetes status and health. The previous studies mentioned on HIV and asthma showed an effect of family support and assistance and the management of the disease (van Servellen and Lombardi 2005; Bauman et. al. 2002). In this study I make the assumption that persons with diabetes will be more sensitive to the presence or absence of such resources than their counterparts without the disease and, therefore, these resources will be an important factor in explaining the differences that may exist between the two groups.

In order to address the question of incentive for return to Mexico for older Mexicans with diabetes, I include migration in the full model (Model 5) and then separately with demographic controls (Model 6). The intent of such modeling is to demonstrate first whether migration status somehow influences the relationship between diabetes status and the health outcomes and then, taking into account family resources, whether there is still an effect. I anticipate that if the relationship between diabetes status and health is moderated by migration status and, depending on whether the effects occur in the United States or Mexico, this effect is diminished by the inclusion of family resources, this relationship will demonstrate incentive or disincentive to return to Mexico for older Mexicans with diabetes.

I conducted regressions using the entire samples from the datasets, comparing persons with diabetes to those without. Due to limitations in sample size of persons with diabetes, a separate analysis using only this sub-sample, which I had originally anticipated, was impossible to conduct. In order to compensate for this shortcoming,

however, I carried out interactions with diabetes status, marital status, and family support. The full models for each of the dependent variables are statistically represented by the following equations;

*Logit (ADL Status **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(marital status **Time 1**) + β(family support **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

*Logit (Self-Rated Health **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(marital status **Time 1**) + β(family support **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

*Logit (Mortality **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(marital status **Time 1**) + β(family support **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

2.5 Findings

2.5.1 Descriptive Statistics

I begin with a description of some of the variation that is present between countries and then for marital status and family support in terms of diabetes health and management. Table 2.1 is a summary of the distribution of percentages for the diabetes variables and migration status by marital status and family support for older Mexicans with diabetes living in the United States (top) and Mexico (bottom). Overall, older Mexicans consider their diabetes to be under control in Mexico to a much greater extent than in the United States. Little variation exists, however, between countries with respect to eating habits in that about fifty percent of persons with diabetes follow a special diet

on both sides of the border, again, regardless of marital status or family support. Mexicans with diabetes in Mexico, however, are far more likely to take oral glucose control therapy than insulin, whereas in the United States older Mexicans take a combination of insulin and oral glucose-control medication. In addition, with respect to Body Mass Index, Mexicans living in Mexico tend to be overweight, whereas their counterparts in the United States are more likely to be obese regardless of their marital arrangement.

Looking at marital status specifically in Mexico, the never married group has a larger representation of overweight (66.14 percent) and extremely obese (2.92 percent) than the other two marital status groups. Married subjects have the greatest number who are obese (13.18 percent) followed by never married (8.30 percent). The divorced or widowed group has a remarkably high percentage of underweight (21.37 percent) compared to their counterparts. Varying slightly from what was observed in Mexico, in the United States, the never married group has the greatest tendency to be obese (67.26 percent); however, the married have the largest percentage of extremely obese (4.50 percent). Nevertheless, similarly to Mexico, divorced or widowed have the greatest proportion of underweight (10.41) in the United States.

In Mexico, as with marital status, the majority who receive family support are taking oral glucose-control medication (86.56 percent), whereas in the United States a combination of insulin and oral glucose control is more common (77.61 percent). Finally, with respect to diet, in Mexico about one-half of the persons with diabetes who receive

assistance from family report being on a special diet (51.79 percent); however, in the United States it is nearly three quarters (72.01).

2.5.2 Regression Analysis

2.5.2.1 United States

Beginning with self-assessed health, in the United States (Table 2.2 top) Mexicans with diabetes are not statistically significantly different in reporting fair health, but are 1.874 ($p < .001$) times more likely to assess their health as poor than persons without the disease in the unadjusted model. With the addition of demographic variables to the model (Model 2), the relationship does not change for fair health , but increases by 5.7 percent (OR = 1.931) for poor health. In Model 3, which includes marital status, fair health is now marginally significant (OR = 1.221 $p < .10$) and poor health is reduced to 1.878. Adding family support to the model does not produce significant effects on the model for self-assessed health (Model 3 fair health OR = 1.221, poor health OR = 1.878; Model 4 fair health OR = 1.221, poor health OR = 1.890). Interaction effects do not yield significant effects for marital status, family support, and diabetes status on self-assessed health in the United States.

For Activities of Daily Living (Table 2.3 bottom) in the unadjusted model (Model 1), older Mexicans with diabetes are significantly more likely to need assistance or need assistance with one or two ADLs. The odds ratios are reduced by about 5 percent for both categories with the inclusion of demographic controls. Adding marital status, as in Model 3, increases the odds ratios, but only by about two percent. Including family support in

Model 4 has no effect on the odds ratios (Model 3 0 ADLs OR = .417, 1-2 ADLs OR = .528; Model 4 0 ADLs OR = .398, 1-2 ADLs OR =.518). Furthermore, there were no significant interaction effects on diabetes status for Activities of Daily Living in the United States for marital status or family support.

In the unadjusted model in the United States (Table 2.4–top) having diabetes increases the odds of mortality, but it is not statistically significant (Model 1 OR = 1.215, $p > .10$). Controlling for demographic characteristics in Model 2 increases the odds ratio for diabetes status by 15.9 percent ($p < .10$); however, adding marital status (Model 3) or family support (Model 4) has no significant effect. There are no significant interaction effects of marital status with diabetes status on mortality in the United States. Interaction results for family support, however, reveal that having assistance from family members decreases their odds of mortality by .7615 relative to their counterparts without the disease that do not have family support.

2.5.2.2 Mexico

Table 2.2 demonstrates the multivariate logistic regression for self-assessed health of older Mexicans living in Mexico (bottom). Mexicans with diabetes have an odds of 1.818 ($p < .001$) greater of reporting fair health than their counterparts in the unadjusted model (Model 1). The effect of having diabetes, however, is insignificant for self-assessed poor health. Adding demographics to the model (i.e. Model 2) increases the effect of diabetes status on self-assessed fair health (OR = 1.927) and yields a marginally significant ($p < .10$) odds ratio for poor health (OR = 1.246). Adding marital status to the

model (Model 3) does not have any effect on the odds ratio for diabetes status. Interactions are significant for divorced or widowed, and diabetes status for fair and poor health. For example, Mexicans with diabetes living in Mexico who are divorced or widowed have odds of 1.2825 greater of reporting fair health and 2.2389 greater of reporting poor health than their married counterparts without the disease. In Model 4, we see that adding family support to the model has no significant effect on the odds ratio of diabetes status on fair or poor health (Model 3 fair health OR = 1.921, poor health OR = 1.249; Model 4 fair health OR = 1.917, poor health OR = 1.268). Unlike marital status, there are family support and diabetes status produce no significant effects on self-assessed health in Mexico.

Now looking at Activities of Daily Living (Table 2.3- top), we can see that older Mexicans with diabetes are more likely to need assistance and more likely to need help with one or two ADLs in the unadjusted model (Model 1 OR = .712, $p < .01$; OR = 1.698, $p < .001$ respectively). Including the demographic controls (Model 2) reduces the odds ratio to .628 ($p < .001$) for the no assistance category, but has no effect on the one or two ADL category. Including marital status in Model 3 has little effect on either odds ratio. Interaction results show that a person with diabetes who has never been married has odds of 1.228 greater of needing assistance with one or two ADLs than a married non-diabetic. As with self-assessed health, there is no significant change in the odds ratio for diabetic status with the inclusion of family support for ADL status in Mexico (Table 2.3, Model 3 0 ADLs OR = .627, 1-2 ADLs OR = 1.718; Model 4 0 ADLs OR = .629, 1-2 ADLs OR =1.702). Interactions, however, yielded significant effects for family support

and diabetes for those not needing any assistance in Mexico, so that an older Mexican with family support and diabetes is .5334 less likely not to need assistance than someone without the disease and does not have family support.

Diabetes status for Mexicans in Mexico increases the odds of mortality by 57.6 percent in the unadjusted model (Table 2.4, Model 1). The odds ratio is increased by another 25.7 percent (OR = 1.833, $p < .001$) with the addition demographic controls in Model 2 and is increased by another 6.4 percent (OR = 1.897, $p < .001$) with the inclusion of marital status in Model 4. Adding family support to the model in Table 2.4 offsets the effect of marital status in Model 3 (Model 3 OR = 1.897, Model 4 OR = 1.812) for mortality.

2.5.3 Migration

2.5.3.1 Descriptive Statistics

Turning our attention to migration status (Table 2.1), in the United States (Table 2.1) older Mexicans with diabetes who are U.S.-born have the largest proportion of never married (71.01 percent). In addition, U.S.-born also represent the greatest percentage of married individuals (57.67 percent). The sixty-one years or greater group has the largest proportion of divorced or widowed (10.55 percent). Finally, the majority who receive assistance are U.S.-born (56.46 percent); however, longer stay immigrants also represent a fair amount of those receiving help. In total, about thirty-three percent of Mexicans receiving help are immigrants who lived in the United States for twenty or more years.

In Mexico, the divorced or widowed category has the greatest percentage of those who had returned to Mexico less than twenty years ago (12.39 percent). The married and never married groups have a greater representation that has never been to the United States (90.72 percent and 89.11 percent respectively), whereas the divorced or widowed have the greatest percentage that spent ten years or less in the United States (11.98 percent), and the never married have the largest percentage who spent more than ten years (6.08 percent). Additionally, the vast majority of Mexicans with diabetes receiving assistance from family have never been to the United States (90.91 percent).

2.5.3.2 Regression Analysis

Including migration in Mexico without the family variables increases the odds ratio slightly from Model 2 in Table 2.2 (bottom) for self-assessed health (Model 2 OR = 1.927 $p < .001$; Model 6 OR = 1.957 $p < .001$), but no change occurs in the United States for self-assessed health. When marital status, family support, and migration status are held constant in Model 5 (Table 2.2) for self-assessed health, the odds ratio for diabetic status is reduced by approximately 2 percent for both fair and poor health. Family support and marital status therefore partly explain the very small effect of migration on the relationship between diabetes status and fair self-assessed health.

The data shows no effect in the United States for Activities of Daily Living and diabetes status when migration history is included in the model, as in Table 2.3 (bottom). In Mexico, family support and marital status have no effect on the relationship between diabetes status and functional status, but the addition of migration in Model 5 shows a

small increase in the odds ratio from the demographic controlled model (i.e. Model 2 OR = .628 p < ; Model 5 OR = .643 p < .001) for not needing assistance. In Model 6, without adjustment for family support or marital status, there is little change in the odds ratio for diabetes status on not needing assistance with ADLs (Model 6 OR = .640 p < .001).

Mortality in both countries follows an interesting trend when migration is included in the model. In the United States (Table 2.4 – top), including marital status and family support increases the odds ratio from Model 2. Adding migration to the full model (Model 5) has no effect, but in Model 6 controlling for demographics and migration only completely offsets the effects of demographics (Model 6 OR = 1.299). In Mexico, taken separately, family support and migration reduce the odds ratio by almost the same percentage for diabetes status on mortality, whereas marital status increases the odds. When included together in Model 5, these factors cause the odds ratio to decrease by an additional 2 percent (Model 4 OR = 1.812; Model 6 OR = 1.818; Model 5 OR = 1.798).

2.6 Conclusions

The purpose of this chapter was to disentangle the relationship between marital status, family support, and health in older Mexicans who have diabetes in the United States and Mexico. The objective was to create a basis for speculation on why older Mexicans might return to Mexico if they are sick with a chronic disease such as diabetes. One of the most interesting results in this chapter is that, regardless of marital status or family support, older Mexicans differ significantly between countries in what type of medication regime they use to treat their diabetes. Interestingly, most Mexicans living in

Mexico are on oral glucose-control medication, while in the United States subjects take a combination of oral medication and insulin. This disparity is suggestive of potential differences in clinical practice between countries that may play an important role in the health and well-being of older Mexicans in general.

There were similarities between countries in the descriptive statistics in terms of marital status and Body Mass Index. For example, divorced or widowed Mexicans with diabetes in Mexico and the United States tended to be underweight, while the married tended to be overweight or obese. In addition, there were no significant variations between countries for diabetes diet or control over diabetes when marital status was taken into consideration. From the basic descriptive statistics we are lead to believe that being married or not in either country is not going to have a great impact on the day-to-day aspects of diabetes.

In contrast to marital status, there is a small benefit for family support on diabetes diet that is observed in this country but not in Mexico. Those receiving family support in the United States are much more inclined to be following a diabetes diet than in Mexico. This difference may be indicative of the fact that if family members are involved in the health care of older Mexicans in the United States, they may be more knowledgeable about what type of foods are necessary or even have more financial resources than in Mexico to assure compliance. This advantage may lend some support in favor of staying in the United States, since the familial resources that are available in this country may prove to be more utile than in Mexico in this sense.

In the multivariate logistic regressions on self-assessed health, functional status, and mortality a clearer difference exists between countries for older Mexicans. For example, in Mexico Mexicans with diabetes have a significantly greater propensity to report having fair or poor health if they are divorced or widowed. In addition, there is no observable benefit of marriage in the United States for mortality, while in Mexico there is one, and it can be explained away by family support. Furthermore, family support for Mexicans with diabetes in Mexico and the United States does not offer respite from the negative consequences of the disease on self-assessed health, but has consequences on functional status in Mexico. In the end, all the observable effects are in Mexico and not in the United States, suggesting that the marital and familial resources that are available to older Mexicans with diabetes south of the border play a more essential role than they do in this country. Most likely, family and spouses are intricate players in a survival strategy adopted for the unit as a whole and then adjusted when a member becomes sick with diabetes.

Although overall marital status did not appear to have much effect in the United States, there was a protective effect of family support on mortality. Moreover, since there was not an effect of family support on self-assessed health and functional status, I am lead to believe that there is a more complex relationship between diabetes status and familial resources in terms of mortality that is not merely about being married.

There are some important trends in migration status that should be noted and are key when contemplating whether older Mexicans have incentive to return to Mexico when they become ill. First, similar to findings in a previous study (Frank and Wildsmith

2005), migrants with diabetes tended to be unmarried in both countries (i.e. divorced, widowed, or never married). In Mexico, this lack of partnership puts these Mexican at a disadvantage in terms of Body Mass Index, self-assessed health, and Activities of Daily Living, since the unmarried tend to be underweight, rate their health poorly, and need more assistance. Second, non-migrants receive the majority of the family support in Mexico, whereas immigrants in the United States receive the most help. Finally, in the multivariate logistic regression, there was a small effect of migration on diabetes status in terms of self-assessed health in Mexico, which was almost completely accounted for by marital status and family support. Taking into account everything, return migration seems to be counterintuitive, since a migrant leaving the United States to go to Mexico would be most likely leaving behind help from family (Liaw, Frey, and Lin 2002; Stoller and Lingino 2001; Angel, Angel, and Markides 2000), which in turn could possibly put them at a disadvantage.

This chapter does not give overwhelming support for return migration. Being married or having family support does not give Mexicans with diabetes an advantage in the United States or Mexico. In fact, in Mexico, not being married puts Mexicans with diabetes at a disadvantage and suggests that staying in the United States might be a better decision. This study, however, has limitations. For example, I had only two variables to work with, and other measures may have more impact in the United States. One in particular is economic support family may give. Families may operate in survival mode in Mexico, but in the United States, children and grandchildren may have economic resources that have positive effects on older Mexicans with diabetes. Moreover, family is

one resource in this project, but healthcare coverage or economics may prove to be important motivations to return to Mexico.

Table 2.1 Weighted Distribution (in Percentages) of Family Assistance and Marital Status with Medication, Health Behaviors, and Migration Variables for Older Mexicans with Diabetes in the United States (Hispanic EPESE – top) and Mexico (MHAS – Bottom)

United States	**Family Assistance**	**Married**	**Divorced/ Separated/ Widowed**	**Never Married**
Taking Insulin (YES)	77.61	85.28	74.80	64.59
Taking Oral Glucose-control medication (YES)	22.39	14.72	25.20	35.41
Diabetes Under Control (YES)	51.97	55.78	50.25	74.29
On a Diabetes Diet (YES)	72.01	64.91	74.95	100.0
Body Mass Index				
Underweight	8.15	9.37	10.41	4.82
Normal	15.65	15.36	16.15	20.95
Overweight	27.69	31.32	29.04	6.98
Obese	43.91	39.45	41.28	67.26
Extremely Obese	4.61	4.50	3.13	.00
Years in the United States				
US Born	56.46	57.67	56.78	71.01
20 Years or Less	8.98	12.26	6.09	.00
21 – 40 Years	17.10	15.02	16.24	4.82
41 – 60 Years	10.47	11.95	10.34	24.17
61 or More Years	6.99	3.10	10.55	.00
Mexico	**Family Assistance**	**Married**	**Divorced/ Separated/ Widowed**	**Never Married**
Taking Insulin (YES)	9.42	6.70	9.22	16.36
Taking Oral Glucose-control medication (YES)	86.56	88.42	83.18	89.83
Diabetes Under Control (YES)	90.34	90.97	99.07	92.44
On a Diabetes Diet (YES)	51.79	57.54	49.03	53.92
Body Mass Index				
Underweight	1.77	.13	21.37	2.63
Normal	21.82	36.65	26.16	20.02
Overweight	64.57	49.98	48.34	66.14
Obese	11.44	13.18	4.12	8.30
Extremely Obese	.39	.06	.00	2.92
Years Since Returning To Mexico				
20 Years or Less	3.43	3.44	12.39	1.28
More than 20 Years Ago	4.73	5.69	.80	5.59
Years in the United States				
Never Been	90.91	90.72	86.82	89.11
Less than 10 Year	7.64	7.47	11.98	4.80
10 Years or More	1.45	1.81	1.20	6.08

Table 2.2 Weighted Logistic Regression Results for Family Resources and Self –Assessed Health at Time 2 for Older Mexicans in the United States (Hispanic EPESE- top) and Mexico (MHAS- bottom) (Reference Category – Excellent/Good) ††

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
United States	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.207	1.874***	1.202	1.931***	1.221†	1.878***	1.221†	1.890***	1.253†	1.868***	1.234†	1.910***
Marital Status (Married)												
Divorced/Separated/Widowed					1.134	.652*	1.133	.640**	1.111	.649*		
Never Married					.983	.936	.981	.924	1.027	.896		
Receives Assistance from Family Members (Yes)							.979	.754†	.986	.746†		
Years in United States (US Born)												
20 Years or Less									2.053***	.706	2.070***	.693
21 – 40 Years									1.625**	.634*	1.648***	.604*
41 – 60 Years									1.362†	.855	1.367*	.826
61 or More Years									1.341	.890	1.357	.807
n	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652
-2 Log Likelihood	2193.07	1259.75	2165.63	1231.25	2156.55	1213.99	2156.52	1211.33	2135.26	1206.47	2143.4	1225.19
Intercept	1.199**	.1315***	1.376***	.1057***	1.292*	.1284***	1.319†	.1623***	1.029	.1890***	1.071	.125***
Mexico	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.818***	1.058	1.927***	1.246†	1.921***	1.249†	1.917***	1.268†	1.946***	1.265†	1.957***	1.242†
Marital Status (Married)												
Divorced/Separated/Widowed					1.206	.807	1.212	.794	1.209	.787		
Never Married					.965	.874	.961	.889	.925	.919		
Receives Assistance from Family Members (Yes)							1.042	.849†	1.033	.856†		
Years Since Returned to Mexico (Never Been to US)												
More than 20 Years Ago									.260***	2.761	.276**	2.853
20 Years or Less									.097***	7.236**	.106***	7.428**
Years in United States (Never Been to US)												
Less than 10									2.085	.504	1.958	.494
10 or More									3.541*	.224*	3.238*	.231*
n	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	4045.52	3166.84	4017.97	3097.37	4014.70	3094.27	4014.40	3091.05	3963.37	3064.79	3967.83	3070.36
Intercept	1.273***	.2811***	1.166	.2890***	1.116	.2997***	1.101	.3152***	1.349*	.2733***	1.426*	.2491***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 1 is unadjusted; Models 2 through 6 are adjusted for demographic characteristics; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Table 2.3 Weighted Logistic Regression Results for Family Resources and Activities of Daily Living at Time 2 for Older Mexicans in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom) (Reference Category–3 or more) ††

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
United States	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.473***	.558**	.408***	.505***	.417***	.528***	.398***	.518***	.392***	.513***	.404***	.504***
Marital Status (Married)												
Divorced/Separated/Widowed					.591***	.672†	.622**	.700†	.639**	.729		
Never Married					1.360	.886	1.427	.926	1.375	.889		
Receives Assistance from Family Members (Yes)							2.645***	2.275***	2.668***	2.327***		
Years in United States (US Born)												
20 Years or Less									.879	.964	.821	.912
21 – 40 Years									.749	.773	.726	.781
41 – 60 Years									1.006	.962	1.002	.974
61 or More Years									.660†	.579†	.677	.620†
n	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652	1652
-2 Log Likelihood	1466.80	1017.00	1336.59	935.91	1308.29	911.12	1269.82	892.92	1265.55	888.92	1331.85	932.56
Intercept	5.794***	10.92***	11.39***	20.57***	15.46***	27.11***	7.308***	14.31***	7.849***	14.99***	12.65***	22.31***
Mexico	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.712**	1.698***	.628***	1.728***	.627***	1.718***	.629***	1.702***	.643***	1.703***	.640***	1.735***
Marital Status (Married)												
Divorced/Separated/Widowed					.737*	.500**	.733*	.509**	.735*	.512*		
Never Married					1.048	.778*	1.056	.734*	1.071	.741**		
Receives Assistance from Family Members (Yes)							.944	1.529***	.933	1.531***		
Years Since Returned to Mexico (Never Been to US)												
More than 20 Years Ago									2.204†	2.740	2.084	3.051
20 Years or Less									1.436	2.147	1.314	2.270
Years in United States (Never Been to US)												
Less than 10									.627	.422	.673	.387
10 or More									.413†	.567	.463	.470
n	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	3235.53	2248.81	2980.18	2129.84	2974.07	2117.42	2973.69	2104.08	2968.25	2102.20	2975.04	2127.59
Intercept	3.514***	.1308***	10.87***	.0268***	11.74***	.0301***	11.98***	.0247***	11.58***	.0240***	10.41***	.0262***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 1 is unadjusted; Models 2 through 6 are adjusted for demographic characteristics; Reference categories are in parentheses; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Table 2.4 Weighted Logistic Regression Results for Family Resources and Mortality by Time 2 for Older Mexicans in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom) -††

United States	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Diabetes	1.215	1.374†	1.384†	1.397†	1.397†	1.299
Marital Status (Married)						
Divorced/Separated/Widowed			1.131	1.049	1.038	
Never Married			1.455	1.433	1.432	
Receives Assistance from Family Members (Yes)				.532***	.514***	
Years in United States (US Born)						
20 Years or Less					.912	.951
21 – 40 Years					.857	.888
41 – 60 Years					.707	.730
61 or More Years					1.475	1.420
n	1876	1876	1876	1876	1876	1876
-2 Log Likelihood	1314.09	1173.01	1170.80	1156.09	1150.27	1264.32
Intercept	.1269***	.0275***	.0255***	.0421***	.0470***	.0349***
Mexico	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Diabetes	1.576***	1.833***	1.897***	1.812***	1.798***	1.818***
Marital Status (Married)						
Divorced/Separated/Widowed			.950	1.011	1.007	
Never Married			2.105***	1.912***	1.898***	
Receives Assistance from Family Members (Yes)				2.006***	1.994***	
Years Since Returned to Mexico (Never Been to US)						
More than 20 Years Ago					.572	.500
20 Years or Less					.455	.310
Years in United States (Never Been to US)						
Less than 10					1.429	1.568
10 or More					1.267	1.195
n	2858	2858	2858	2858	2858	2858
-2 Log Likelihood	2277.39	2162.13	2123.40	2089.63	2087.63	2158.37
Intercept	.1086***	.0783***	.0756***	.0557***	.0576***	.0817***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 1 is unadjusted; Models 2 through 6 are adjusted for demographic characteristics; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Chapter 3: Yeah, But Do You Have Insurance? —Healthcare Access

3.1 Introduction

Healthcare coverage and the reliability of medical providers can have a substantial impact on the long-term health of older Americans (Porell and Miltiades 2001). This is evidenced by the fact that older Medicare-eligible adults who have better access to health care have better survival odds and decreased likelihood of becoming disabled (Porell and Miltiades 2001). Nonetheless, little attention has been paid to the role of health care in the health and mortality advantage of older individuals of Mexican descent living in the United States.

Mexican Americans in general are poor utilizers of healthcare services (Villarejo 2003) and are less likely to be insured than Anglo-whites (Angel, Angel, and Markides 2002). As demonstrated in Table 4.1, about thirty percent of Mexican Americans in the United States have not visited a physician in the past year, compared to only fifteen percent of Anglo-whites. Furthermore, about thirty-four percent of Mexican Americans report not having a regular doctor. Given these statistics taken from the National Center for Health Statistics (2004), the health status of Mexican-descent individuals in this country is even more perplexing; since regular preventative care and treatment is now an essential part of health in the United States (Becker, Gates and Newsom 2004), and this group is lacking this basic element of wellness.

Since Mexican Americans have shown to be poor utilizers of formal medical care and diabetes is highly prevalent in the population, explanations of their superior health and mortality dispositions are even more crucial, since not having access to regular

medical care is associated with a higher prevalence of kidney disease, increased all-cause mortality, and diabetes-related deaths in Mexican Americans (Kuo et. al. 2003; Harris 1999). Can this group's favorable mortality profile be explained by the return of Mexicans who have chronic diseases, such as diabetes, to Mexico to avert the negative effects of poor healthcare access in the United States?

This chapter will present findings from the quantitative analysis for healthcare coverage on self-assessed health and Activities of Daily Living for older Mexicans with diabetes who live in the United States and Mexico. The purpose is to attempt to disentangle the potential association between migration and health in terms of healthcare access and to establish possible motivation for return migration to Mexico.

3.2 Background

3.2.1 Healthcare Coverage

In order to define the relationship between migration, health, and healthcare coverage, it is important to have a basic understanding of the differences that exist between healthcare programs in the United States and Mexico. This section is not intended to be an exhaustive explanation of each plan, but rather a summary of the fundamental components of each of the most common plans.

3.2.1.1 United States

Healthcare coverage for older Mexicans in the United States and Mexico, although structurally different, is contingent upon work history. People who work in the United States until retirement age receive points that make them eligible for Social

Security benefits and Medicare (Dolgoff, Feldstein and Skolnik 1997). In order to receive points, however, one must work for an employer that withdraws FICA tax from one's pay check. While Social Security provides a monthly stipend for persons over the age of 65 or who are physically unable to work, Medicare is a nationalized healthcare insurance program for retired and disabled persons.

Employment by a company that pays FICA tax is usually limited to legal residents, persons with work visas, and citizens of the United States. Undocumented Mexican immigrants are often employed as maids, construction workers, agricultural workers, and nannies (Ehrenreich and Hochschild 2003) and therefore usually do not receive employment benefits simply by the nature of the work. Furthermore, in order to accumulate an adequate number of points to receive Medicare and Social Security, Mexican immigrants would have to obtain residency papers early in their work lifecycle to qualify.

Mexicans who immigrate to the United States and do not qualify for Medicare are not without options for healthcare coverage when they retire. If they are disabled, have a low income, and have citizenship, they can qualify for Medicaid (Dolgoff, Feldstein, and Skolnik 1997). Medicaid is a public health insurance program that is available through each state. Another option is if they are not low income, Mexican immigrants may purchase their own insurance through a private HMO or insurance plan. This alternative, however, is quite costly and few, Mexican or not, can afford it.

Older Mexicans living in the United States who do not have access to Medicare, Medicaid, or private insurance usually go without. Not having insurance means little preventative care, an increased utilization of local emergency rooms as primary care

physicians (Phelps, Taylor, Kimmel, Nagel, Klein, Puczynski 2000), and poor access to expensive pharmaceuticals (Kennedy and Erb 2002). For someone who is diabetic this situation could have negative consequences for longevity and on quality of life. It could result in diabetes patients not testing blood sugar on a regular basis, not having regular doctor visits, and most importantly, not having insulin or oral blood glucose-control medication, and consequently experiencing a more rapid progression of the co-morbidities that are associated with diabetes. Not having insurance, therefore, may be an incentive to return to Mexico for persons with diabetes, particularly if these resources are available in their country of origin.

3.2.1.2 Mexico

As in the United States, healthcare coverage is employment based in Mexico. The primary difference between Mexico and the United States is that there is no nationalized retirement or disability-based insurance like Medicare in that country. People who retire receive benefits from whichever healthcare system they participated in when they were employed.

The primary insurance options for all citizens of Mexico are Instituto Mexicano del Seguro Social (IMSS), Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estados (ISSSTE), PEMEX (self-insured Petróleos Mexicanos), private health care, and the public healthcare system. IMSS is the most common insurance and is available to persons who are employed in a non-governmental organization (Barry 1992). Individuals and families in this system are eligible for full healthcare services and are able to see medical doctors on a regular basis, receive routine testing, and obtain

medications, all through the same program. In addition, retirees who are vested are able to receive services, as well as older Mexicans who do not otherwise qualify but are able to pay out-of-pocket into the system.

ISSSTE is the healthcare program for government workers and their families (Barry 1992). As with IMSS, retired government workers and older Mexicans who buy into the system are able to receive benefits. In contrast to IMSS and ISSSTE, PEMEX is the only petroleum producer in Mexico and operates its own healthcare program that is offered to employees and their families. Lastly, many Mexicans who have the economic resources choose to receive their health care from private physicians and hospitals. Usually these Mexicans pay out of pocket for all services and have the ability to be more selective in terms of type of provider.

Mexicans who are ineligible or cannot pay for the above programs are not without options as they would be if they were in the United States. The federal government provides healthcare services to all individuals with or without insurance (Barry 1992). The country is broken down into catchments-type areas in which all residents in that area are able to utilize medical care at the public health clinics and hospitals. The major drawback to this program is the inadequate balance between those in need and resources that are available. Often the public health system does not have sufficient medicines for its patients, and clinics are so inundated with people that the sick end up waiting hours to receive attention or have to rely on non-governmental organizations such as the Red Cross.

There are important differences between the healthcare systems in the United States and Mexico that may serve as incentive for return migration. Although Medicaid

in the United States is available to low-income families and individuals with disabilities, it is not universal coverage for all persons in this country. The working poor, for example, often do not qualify for Medicaid because they are above the economic limits for eligibility and too poor to buy into an HMO or private insurance. Furthermore, proof of residence may be required in order to apply. That constraint leaves many Mexicans living in the United States ineligible for economic-level-based healthcare coverage. However, if they were to return to Mexico, although its healthcare system has its limitations, Mexicans could receive medical treatment and medications from the public healthcare system.

3.2.2 Healthcare Coverage and Health

Healthcare coverage and access has had its place in the political and media spotlight for a great number of years. The cost of healthcare has reached astounding proportions of our nation's gross national product, and insurance companies are covering fewer individuals with greater out-of-pocket expense for the consumer. Medicare-dependent older Americans on fixed incomes suffer the consequences of these changes because they are unable to afford supplemental insurance to complete their healthcare coverage. As a result, millions of our nation's older citizens are going without complete coverage (Havrda, Omundsen, Bender and Kirkpatrick 2005).

The type of insurance one has can have a large impact on the type of care and treatment one receives as well. For example, in a study in Florida, a group of investigators looked at the likelihood a woman with breast cancer would receive a certain type of treatment, based on the type of hospital where the condition was diagnosed and

type of insurance the woman had (Richardson, Tian, Voti, Hartzema, Reis, Fleming, and MacKinnon 2006). They found that insurance type made a difference in the aggressiveness of the treatment regime she received. Ironically, women with private insurance or Medicare were less likely to receive the most effective treatment combinations (i.e. chemotherapy with hormone treatment, etc.).

In another study on women with breast cancer and insurance type, women with HMOs or Medicaid, or women who paid out of pocket for their treatment, were less likely to receive treatment that did not involve a mastectomy (Mitchell and Hadley 1997). Furthermore, women who were members of HMOs were more likely, whereas Medicaid recipients were less likely, than those with private insurance to bypass the nearest hospital to receive treatment at a hospital with a better reputation. Both of these studies suggest that, in fact, the type of insurance one has influences the type of treatment that he or she receives, which can have an impact on overall actual or perceived health and longevity for someone with a disease.

The older Mexican-American population in the United States is particularly susceptible to the variability in healthcare coverage. The type of employment they have may limit the insurance options they have to begin with, which also may affect the health and mortality disposition. Moreover, their immigrant status may make them ineligible to receive public healthcare services, or their low income may make it impossible to buy into a private healthcare program (Greenwell, O'Keefe, and DiCamillo 2005). Over time the type of health care Mexican Americans have access to should have an effect on the long-term vitality of this group's older population, but for some reason, it does not seem to make a difference.

3.2.3 Migration and Healthcare Coverage

There is evidence that some Mexicans who are unable to receive health care in the United States return to Mexico to receive medical treatment (Angel, Angel, and Markides 2002). This group usually returns to Mexico with the intent to come back immediately to this country.

In the previous chapter, I referred to the literature on return migration to place of origin, family resources, and health among our nation's older population. Although older individuals tend to move closer to family when they experience an initial decline in health (Longino, Jackson, Zimmerman, and Bradsher 1991), there does not seem to be an incentive for older Mexicans to return to Mexico. With respect to healthcare coverage and return migration, the literature is sparse and therefore, the framework for the modeling in this chapter will be largely theoretical.

Most of the research that has been done in this area has been with the older mobile American population known as "snowbirds." For example, Daciuk and Marshall (1988) investigated the deterrents to seasonal migration for a group of Canadians who spent their winters in Florida. Looking at health status, cost of medical care, and access to healthcare coverage, they found that Canadians who had incurred increased medical costs as a result of declining health were less likely to return to Florida for the subsequent winter. Healthcare access was the primary reason for not returning for these Canadian "snowbirds." Although lack of healthcare coverage in place of destination may deter return for temporary older migrants, we do not know if this same deficit may be incentive to return to place of origin for older Mexicans.

Mexicans, regardless of age, who reside in the United States have little or no healthcare coverage, as reflected in Table 3.1. Moreover, many Mexicans who are unable to receive health care in the United States do return to Mexico temporarily to receive medical treatment (Angel, Angel, and Markides 2002); however, we possess little information on those who return permanently. Although the system in Mexico has its limitations, all Mexican citizens have the right to access public health services. If there is no way to access health care in the United States, the healthcare system in Mexico, despite its flaws, may be an enticement for Mexican nationals to return to Mexico as Canadians do to Canada.

3.3 Research Objectives

Distinct differences exist between healthcare systems in the United States and Mexico. Taking into account these differences and the limitations in access and coverage for older Mexicans with diabetes in this country, it is reasonable to believe that this population might return to Mexico in search of a better way of life. If healthcare coverage is a possible factor in return migration for older Mexicans with diabetes, then we should observe variation in effects of healthcare coverage in the United States, as well as negative effects for those with Medicaid or who do not have Medicare. Additionally, in Mexico, there should be a benefit regardless of healthcare program, but particularly for those in which migrants are more likely to be enrolled.

In this chapter I will establish a pattern that exists for older Mexicans with diabetes with respect to healthcare coverage that is present in the United States and Mexico. In addition, I will determine if the effect of diabetes status on self-assessed

health and functional status is moderated by healthcare type. Finally, using a model similar to the previous chapter, I will utilize data from both the United States and Mexico to make comparisons between diabetic Mexicans with different migration experiences who live bi-nationally. Ultimately, the purpose of this chapter is to continue to make a case for or against return migration to Mexico.

3.4 Data and Methods

3.4.1 Data

The data that I will use for this chapter comes from the Mexican Health and Aging Survey (MHAS) and the Hispanic Established Population of Epidemiologic Studies of the Elderly (Hispanic EPESE). The Mexican Health and Aging Survey is a nationally representative panel survey of Mexicans aged 50 and over and their spouses in Mexico from the year 2000 (N=15,186; diabetics n = 2420). Participants were recruited in conjunction with the 2000 National Employment Survey/ Encuesta Nacional de Empleo (ENE). Representatives of the Instituto Nacional de Estadística, Geografía, e Informática (INEGI) in Mexico, conducted interviews in the respondents' homes. Respondents and their spouses answered questions regarding their demographic, health, family, and economic conditions, among other topics. A follow-up wave of interviews was conducted in 2003 with the individuals or a proxy respondent (N = 14,277).

The Hispanic EPESE is a cohort longitudinal study of older Mexican Americans living in the Southwest. The sample was selected using probability design of elderly Mexicans living in Texas, Arizona, California, Colorado, and New Mexico. The original

data was collected in 1993–1994 and was followed by three subsequent waves (1995-1996, 1998–1999, 2000–2001). If a respondent was not located in person due to death or relocation, proxy information about him or her was collected from family or friends. Follow-up rates are nearly 86% of the original sample of 3,050.

Since the Hispanic EPESE dataset's age distribution is quite old (i.e. 70 years and older), this study limits cases to those older than 69 years in the MHAS dataset. Because of this limitation in age range and the attrition in subsequent waves, the final sample sizes for this analysis were 2,538 for the MHAS and 1,652 for the Hispanic EPESE. I will use individual level sample weights created by the principle investigators of the datasets for the entire statistical analysis using this dataset.

3.4.2 Variable Measurement

The dependent variables that I used for this chapter are self-assessed health and functional status. Self-assessed health was originally constructed using a five-category scale, ranging from excellent (5) to poor (1). However, the Hispanic EPESE does not include a Very Good category, so I categorized Very Good with the Good category for the MHAS dataset to facilitate comparability. Furthermore, the low case frequency in the Excellent and Good groups required me to collapse the categories even further into three. The final variable, therefore, was Excellent/Very Good/Good, Fair, and Poor. Other researchers have used similar methods (Cho, Frisbie, and Hummer 2004). I then created a dummy variable in which Excellent/Very Good/ Good serves as the reference category.

I measured functional status by an index of questions related to ability to perform personal care or Activities of Daily Living (ADLs). Subjects were asked whether or not

they had difficulty performing daily personal-care tasks (such as bathing). Five of the questions on each survey were comparable (yes = 1 /no = 0). The Hispanic EPESE dataset had an extra category called “grooming” that was not on the MHAS. I dropped this category to make the ADL variable comparable to the other dataset. I then summed up the total number of “yes” responses and assigned a value ranging from 0 to 5 to each subject, with higher score indicating more assistance needed. Because of the small range of numerical values for this variable and the fact that less than five percent of the subjects reported a score higher than three on both datasets, I used the categories of zero, one to two, and three or more.

Availability of information in the given datasets greatly determined the breakdown of healthcare categories. For the data in the United States, since the sample was 70 years of age and older, most had a combination of Medicare with some other healthcare type. Therefore, I constructed the categories as follows: Medicare only, Medicare with Medicaid, Medicare with private health care or HMO, Medicare with another type of health care, or other health care without Medicare. The other health care without Medicare category can include people with Medicaid, other health care, private health care, HMO, or no health care at all. The category has its limitations since I am unable to capture the uninsured; however, the data do not provide me with an alternative. The fact that there is a Medicare overlap also limits this analysis. Most of the subjects had a combination of Medicare and another type of health care. This overlap limits my ability to analyze the effects of having Medicare or not.

In Mexico, the data was more straightforward, and I was able to categorize the variable into five separate categories (IMSS, ISSSTE, PEMEX, Private health care, and

other health care). The case frequency for PEMEX is very small and conceivably could have been combined with private health care. The reason I opted to leave it as a separate category was that PEMEX is unique because is self-insured, and I felt that it was important to contrast it with the other healthcare types.

In order to evaluate the relationship between diabetes health and economic resources, I generated descriptive statistics, using aspects of diabetes management and diabetes status. The variables I establish are use of oral glucose-control medication, insulin injections, Body Mass Index (BMI), control over diabetes, and adherence to a diabetes diet, to test further the severity of the subjects' illness. With respect to the oral glucose-control medication and insulin question on the Hispanic EPESE survey, one question asked if subjects were taking insulin, diabetes medication, or both. I coded insulin as 1 if they were taking only insulin or if they were taking both, and coded diabetes medication only if they answered yes to diabetes medication but not both. Therefore, I established the variable as insulin or both in order to make it comparable to the Mexican dataset. In Mexico, the question asked if persons were taking insulin or oral glucose-control medication; therefore, I created two separate categories as such.

I calculated body Mass Index (BMI) by creating a ratio of subjects' self-reported weight to their height for each country in its respective measurement system (i.e. kilograms versus pounds). I then divided respondents' BMI into five categories: underweight (BMI <19), normal weight (19<BMI<25), overweight (24<BMI<30), obese (29<BMI<40), and extremely obese (BMI>39). Finally, for the Hispanic EPESE dataset, I calculated BMI using averages for missing values, substituting missing values at Time 1 with averages taken from two times periods that were available for weight and height. I

measured diet dichotomously according to whether subjects follow a special diet for their diabetes (yes = 1), and if subjects' diabetes was under control, I also measured dichotomously. Finally, for the regression analysis, I use only diabetes status, which measures whether subjects have been told by medical personnel if they have diabetes. I was unable to distinguish between Type 1 and Type 2 diabetes from the variables that were available for analysis, which may create some bias in the findings. However, since the majority of adults in the United States have Type 2 (American Diabetes Association 2000) and it is unlikely that those who developed diabetes in childhood would survive to be older that sixty-nine, I make the assumption that the majority of subjects in these datasets developed diabetes as adults (i.e. Type 2).

My analysis is limited to the U.S.-born and Mexico-born and, in terms of migration, uses history of migration, years lived in the United States, and years since returning to Mexico (for the Mexico sample). In Mexico, years lived in the United States are coded as none, 10 years or less, or more than 10 years. In the multivariate analysis of the MHAS data using the functional status variables, I had to collapse categories for the years since returning variable, due to low cell size counts, to preserve the reliability of the results. This reduction resulted in three categories: never, more than 20 years, and 20 years or less. Although twenty years is a long period of time and limitations do exist with respect to interpretation, I felt that including such a variable in the model was better than completely eliminating it. In the United States, I categorized migration as U.S.-born, 20 years or less, 21 to 40 years, 41 to 60 years, and 61 years or more.

To account for the confounding effects of the major explanatory variable with the primary demographic characteristics of the samples, I utilized standard controls (i.e. sex,

level of education, and age) and categorized age as 70–75 , 76–80, and 81+. Level of education is categorized as less than 7 years, seven to eleven years, twelve years, and more than twelve years, for the same reasons. Finally, I code gender as female = 1.

3.4.3 Analysis

In order to compare healthcare types for Mexicans based on migration history, diabetes status, and health indicators, I produced cross tabulations to assess the distribution proportions of healthcare type by the diabetes control and management variables. In order to determine the effects of healthcare type, net of demographic controls, on the relationship between self-rated health, functional status, and diabetes, I conducted multivariate analysis using logistic regression. I do not use mortality for this chapter due to lack of detailed healthcare information in the third wave of the Hispanic EPESE.

Since the analysis is limited with respect to number of waves collected for the MHAS data and the dependent variables are categorical, I used simple logistic regression rather than hazard or growth curve models. Statistical models, therefore, for this analysis predicted self-assessed health and functional status at Time 2 (MHAS 2003, Hispanic EPESE 2001) by healthcare type also at Time 2 for the Hispanic EPESE and Time 1 for MHAS. The modeling in this chapter deviates from other chapters due to its cross-sectional nature; however, data for healthcare type in the United States in the first wave was unavailable.

I conducted modeling similar to Chapter 2, with a focus on health care rather than familial resources. First, I carried out stepwise regressions, using each dependent variable at Time 2 to determine individual and full model effects. Model 1 is the unadjusted

model for diabetes status, and I present it as a reminder of the unadjusted effects of diabetes status on the health outcome indicators. I include demographic controls in Model 2 in order to discount any effect that may be attributed to basic characteristics of the subjects (i.e. age, level of education, etc.). In Model 3, I introduce healthcare coverage to the model in order to demonstrate whether the effects that are observed for diabetes status on self-assessed health and functional status can be explain by the variability of this variable. The idea attempts to demonstrate motivation for movement back to Mexico. For example, if an effect is observed for healthcare coverage, interactions reveal that persons with diabetes who have Medicare and Medicaid are at a disadvantage in the United States, and there is an advantage to having public health care in Mexico, these factors could demonstrate a reason to return.

As in Chapter 2, I include migration in the full model (Model 5) and then separately with demographic controls (Model 6) in order to demonstrate any variation that may exist for migration status that may reflect an advantage and thus an incentive for return. Additionally, if there is a migration status effect, I examine whether it is present after taking into account healthcare type. This approach further addresses the incentive or disincentive for return to Mexico for older Mexicans with diabetes.

I conducted regressions using the entire samples from the datasets, comparing persons with diabetes to those without. Due to limitations in sample size of persons with diabetes, conducting a separate analysis using only this sub-sample, as I had originally anticipated, was impossible. In order to compensate for this shortcoming, however, I conducted interactions with diabetes status and healthcare coverage.

The full models for each of the dependent variables are statistically represented by the following equations;

*Logit (ADL Status **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(marital status **Time 1**) + β(level of education) + β(healthcare type **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

*Logit (Self-Rated Health **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(marital status **Time 1**) + β(level of education) + β(healthcare type **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

3.5 Findings

3.5.1 Trends in Healthcare Coverage

I begin this section by discussing the variation that exists in healthcare type by health behaviors and diabetes management in the United States and Mexico. As illustrated in Table 3.2 and as discussed in Chapter 2, older Mexicans in Mexico with diabetes are much more likely to take oral glucose-control medication than insulin, whereas in the United States the opposite is the case. Overall, in Mexico, the highest proportion of subjects taking insulin or oral glucose-control medications has private health care (21.02 percent and 100.0 percent respectively), whereas in the United States, subjects with Medicare and another form of health care (81.40 percent) have the highest proportion taking a combination of insulin and oral glucose-control medication, and persons without Medicare have the highest representation of persons taking oral glucose-control medication (26.27 percent).

Health behaviors also vary by healthcare provider type for Mexicans in both countries. First, in terms of diabetes diet, in Mexico, PEMEX (81.16 percent) has the highest proportion of persons following a special diet followed by IMSS (67.47 percent). Private health care has the largest proportion of underweight subjects with diabetes (15.62 percent), as well as those who are obese (19.04 percent). IMSS (1.78 percent) and ISSSTE (1.46 percent) are the only categories that have any subjects who are extremely obese. Nearly a third of the subjects with other healthcare services are normal or underweight, whereas, subjects who have IMSS, ISSSTE, or PEMEX are vastly overweight, obese, or extremely obese.

In the United States, the greatest proportion of Mexicans on a diabetes diet has Medicare only (58.92 percent), followed by those who have Medicare with Medicaid (48.90 percent). In terms of Body Mass Index, there is a larger representation of extremely obese persons with diabetes than in Mexico, and the majority of all categories are overweight or above. The group without Medicare has the largest subgroup of underweight (16.70 percent), followed by those with Medicare and Medicaid (11.24 percent).

A striking difference between countries is evident, regardless of healthcare coverage type, with respect to self-reported diabetes control. The greater part of Mexicans living in Mexico consider their diabetes under control, whereas in the United States only about fifty percent do. In Mexico, subjects with other health care are least likely to rate their diabetes under control (88.98 percent, which is still the majority), and in the United States persons with Medicare and another health care (40.59 percent) are least likely.

Overall, older Mexicans with diabetes have a general tendency to rate their health as “fair” (Table 3.2). The exception in Mexico is that a greater proportion of persons with diabetes with private health care rate their health as excellent/good (50.19 percent) than any other healthcare type. Oddly, also in Mexico, there are a great number of subjects who rate their health as poor who also have other health care (18.69 percent). In the United States, respondents with Medicare and another type of health care have the highest proportion of patients who rate their health as excellent/good (35.06 percent) compared to any other healthcare category. This same healthcare coverage group also has the largest number who rates their health as poor (28.51 percent).

Greater variation exists in the United States than in Mexico for Activities of Daily Living (ADLs) and healthcare coverage (Table 3.2). In Mexico, with the exception of PEMEX (55.94 percent), most subjects in each healthcare provider category report needing no assistance with their ADLs. In the United States, on the other hand, only 60.27 percent of people with healthcare coverage other than Medicare report needing no assistance. However, 96.37 percent of those with Medicare and another type of healthcare coverage need no help with their ADLs.

3.5.2 Regression Analysis

This next section is devoted to determining whether healthcare type moderates the impact of having diabetes on subjective and objective health as measured by self-assessed health and Activities of Daily Living status.

3.5.2.1 United States

The descriptive statistics revealed that on a bi-variate level, some variation does exist between healthcare type and self-assessed health. The next two sections will present the multivariate regression results for self-assessed health, functional status, and diabetes control for healthcare type. First, in the United States the effects of diabetes status on self-assessed health for Mexicans living in the United States (see Table 3.4–bottom): in the unadjusted model (Model 1) persons with diabetes differ inconsequentially from their counterparts in reporting fair health. Conversely, older Mexicans with diabetes have 87.4 percent ($p < .001$) higher odds of reporting poor health than those without the disease. Adding demographics in Model 2 does not change the odds ratios significantly for diabetes status; however, in Model 3, with the addition of healthcare coverage, the odds ratio for fair health increases by 5 percent, yielding marginally significant odds (i.e. $p < .10$). There were no significant interactions between diabetes status and health care in the United States for self-assessed health.

In terms of functional status, overall the United States sample is at increased odds of needing assistance or needing help with one or two ADLs if they have diabetes in the unadjusted model (Table 3.5, Model 1). With the addition of demographic variables in Model 2 the odds ratio changes slightly (ADLs = 0, OR Model 1 = .473, Model 2 = .408; ADLs = 1-2, OR Model 1 = .558, Model 2 = .505). Including healthcare coverage in Model 3 increases the odds ratio for needing no healthcare assistance by ten percent (OR = .418, $p < .001$) but has no effect on the odds ratio of needing assistance with one or two ADLs (OR = .506, $p < .001$). Nevertheless, there were no significant interactions between diabetes status and health care in the United States for Activities of Daily Living.

3.5.2.2 Mexico

As shown in Table 3.4 Mexico (bottom), having diabetes increases one's odds significantly of reporting fair health (OR = 1.818 $p < .001$) but not poor health (OR = 1.058 $p > .05$) in the unadjusted model (Model 1). These effects change slightly with the inclusion of demographic controls (Model 2), causing poor health to become marginally significant (OR = 1.246 $p < .10$). With the inclusion of healthcare coverage in Model 3, there is little effect on the odds ratio for fair health; however, poor health increases by 21.4 percent and is now significant at the .01 level. No significant interactions occurred between diabetes status and health care in Mexico for self-assessed health.

In Table 3.5 for functional status (Mexico, bottom) we see that there is a lower odds of needing no assistance and a greater propensity to need help with one or two ADLs for persons with diabetes than those without in the unadjusted model (Model 1 ADLs = 0, OR = .712 $p < .01$; ADLs = 1-2, OR = 1.698 $p < .001$). The effect for not needing assistance is altered little by the addition of demographic controls in Model 2. Including healthcare coverage in Model 3 has little effect on needing no help, but for needing assistance with 1 to 2 ADLs increases the odds ratio by 12.2 percent. Interactions reveal significant results in that Mexicans with diabetes who have PEMEX have odds of .2765 less of needing no assistance than those without the disease with IMSS. Additionally, Mexicans with diabetes who have other health care have the odds of .1690 less of needing no assistance with their ADLs.

3.5.3 Migration

3.5.3.1 Descriptive Statistics

Table 3.3 illustrates healthcare provider distributions by migration status for Mexicans with diabetes in both countries. First, the most common work-based healthcare system is IMSS, and the majority of persons with diabetes who never migrated or stayed in the United States less than ten years are clientele of this program (46.01 percent and 54.69 percent respectively). In contrast, of the migrants who spent more than 10 years in the United States, more have other health care than any other healthcare program (67.20 percent).

In the United States, native-born Mexicans represent the greatest proportion of subjects with Medicare and an HMO/Private health care (66.13 percent) and with Medicare and another type of health care (67.83 percent) (Table 4.3). Long-term immigrants (i.e. 21 years or more) are most representative in the group with Medicare only and other health care without Medicare. Short-term immigrants (20 years or less) have the greatest represented proportion among those with Medicare and another healthcare type. In summary, in Mexico, there appears to be a clear divide between migrants and non-migrants' healthcare coverage, whereas in the United States no such strong difference exists.

3.5.3.2 Regression Analysis

In Model 4 on Table 3.4, I add migration history to the models for self-assessed health in Mexico and the United States. There is little effect on the models for fair or poor health with the inclusion of migration history in Mexico, but healthcare type continues to yield a strong effect on the relationship between diabetes and the self-assessment of

health. A comparison of Model 4 to Model 5, (which is the model without healthcare coverage) makes clear that migration history has no impact on the influence of diabetes condition on self-assessed health, and healthcare coverage has a much stronger effect in Mexico.

In the United States (Model 4 Table 3.4), with the inclusion of migration, the odds ratios change by about three percent each, but fair health moves from marginally significant to significant at the .05 level. Migration alone in Model 5 has little effect on the odds ratio for diabetes on self-assessed health. So taken alone, migration may not have much effect on the relationship between diabetic status and self-assessed health, but when taken in conjunction with healthcare coverage, it may produce a small contributory factor.

For Activities of Daily Living in Mexico and the United States the inclusion of migration to Model 4 (full model with healthcare type) has little influence on the odds ratios in both countries. Furthermore, in Model 5, which looks at the effects of migration status without health care, there is not significant difference from Model 2 if one adjusts for demographic variables alone. The results for Activities of Daily Living are similar to those found for self-assessed health: healthcare coverage has a greater impact on health than migration history.

3.6 Conclusions

One similarity between countries is the propensity for older Mexicans who have private or employment-related healthcare programs (i.e. IMSS, ISSSTE, Medicare with HMO/Private health care, etc.) to be overweight or obese. In the multivariate logistic

regression, adding healthcare coverage to the model has no effect on the relationship between ADL status and diabetic status in the United States. The effect of adding healthcare coverage to the model in Mexico, however, yielded interaction effects for ADL status. These findings suggest that there is a difference in the type of health care a Mexican with diabetes has in Mexico that may have an effect on their overall health. In addition, despite the fact that older Mexicans with diabetes who are on Medicare with Medicaid in the United States may be proportionally more likely to be underweight and have poorer functional status profiles, when other factors are taken into account, they are not any worse off than their counterparts with other healthcare coverage combined with Medicare.

Including migration status has little effect on the modeling for diabetes health of older Mexicans in Mexico and the United States. Yet Mexicans, who migrated, regardless of which country they reside in, tend to have healthcare coverage that is not the mainstream. For example, in the United States many Mexicans have Medicare with Medicaid or health care without Medicare. Similarly, in Mexico migrants represent the majority who has other health care. Health behaviors such as diabetes diet, BMI, and medication usage also vary by healthcare coverage type in that older Mexicans with other health care in Mexico and Medicare with Medicaid in the United States tend to be underweight. In sum, migration history in Mexico determines the type of healthcare program older Mexicans receive primarily due to the fact they do not have work histories in that country, which in turn impacts the diabetes health outcomes of that group.

Migration alone is not the determinant of health per se, but rather this process streamlines older Mexicans in Mexico into a healthcare destiny that places them into a

specific type of healthcare program. Migration status in the United States does not have the same function because older Mexican immigrants in this country do have the opportunity to enroll in healthcare programs other than Medicaid, which as a result may level the playing field for this population.

Table 3.1 Health Treatment Indicators for Mexicans in the United States

	Mexicans			Whites		
Healthcare Visits to Medical Professional (MD office, ER, etc)	**1997**	**1999**	**2001**	**1997**	**1999**	**2001**
None	28.9	30.2	31.4	14.7	15.5	14.3
1-3	40.8	43.0	39.2	46.6	46.0	46.4
4-9	18.5	18.2	19.6	24.4	24.5	25.4
10 or more visits	11.8	8.7	9.8	14.3	14.1	13.9
No Usual Source of Health Care among Adults 18-64	**1996**	**2000**	**2001**	**1996**	**2000**	**2001**
	28.1	33.7	34.6	15.0	15.2	13.9

** Source: National Center for Health Statistics 2004

Table 3.2 Weighted Distribution (in Percentages) of Healthcare Type with Diabetic Health Indicators for Older Mexicans with Diabetes in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom)

United States	**MC w/ Medicaid**	**MC w/ HMO/Private**	**MC w/ Other**	**Medicare (MC)**	**Other w/o MC**
Taking Insulin (YES)	78.59	81.07	81.40	73.73	80.78
Taking Oral Glucose-control medication (YES)	21.41	18.93	18.60	26.27	19.22
On a Diabetes Diet (YES)	48.90	55.37	30.12	58.92	48.09
Body Mass Index					
Underweight	11.24	1.50	.00	9.26	16.70
Normal	18.45	16.16	10.00	15.25	12.23
Overweight	33.92	25.76	33.89	21.97	25.25
Obese	33.13	50.72	50.62	52.59	41.91
Extremely Obese	3.26	5.86	5.49	.93	3.90
Diabetes Under Control (YES)	50.72	59.20	40.59	52.28	58.31
Self-Assessed Health					
Excellent/Good	25.62	32.03	35.06	25.95	1.09
Fair	47.66	58.91	36.44	56.49	86.10
Poor	26.72	9.06	28.51	17.56	12.81
Activities of Daily Living					
0	70.96	89.87	96.37	78.02	60.27
1-2	10.36	3.06	.00	8.11	27.30
3+	18.68	7.06	3.63	13.87	12.43
Mexico	**IMSS**	**ISSSTE**	**PEMEX**	**Private**	**Public Health Care**
Taking Insulin (YES)	7.91	10.22	6.90	21.02	13.91
Taking Oral Glucose-control medication (YES)	91.35	87.08	98.83	100.00	80.77
On a Diabetes Diet (YES)	67.47	51.05	81.16	45.15	36.35
Body Mass Index					
Underweight	.11	.00	1.18	15.62	11.23
Normal	38.42	16.98	11.35	25.99	25.35
Overweight	50.57	67.69	86.30	39.34	54.78
Obese	9.12	13.88	1.17	19.04	8.64
Extremely Obese	1.78	1.46	.00	.00	.00
Diabetes Under Control (YES)	93.98	91.44	100.00	100.00	88.98
Self-Assessed Health					
Excellent/Good	29.89	35.81	35.58	50.19	27.46
Fair	51.27	55.46	54.31	37.55	53.86
Poor	12.92	14.64	10.11	12.26	18.69
Activities of Daily Living					
0	72.16	76.42	55.94	72.58	67.87
1-2	24.06	9.91	.00	2.13	19.02
3+	3.79	13.68	44.06	25.29	13.11

Table 3.3 Healthcare Coverage by Migration Status for Persons with Diabetes Only- Weighted

	EPESE					MHAS		
	US Born	**20 Years or Less**	**21- 40 Years**	**41- 60 Years**	**61 Years**	**None**	**10 yrs or Less**	**> 10 Years**
United States								
Medicare with Medicaid	59.07	6.03	17.96	8.26	8.67			
Medicare with an HMO/Private Health care	66.13	11.01	7.26	8.02	7.58			
Medicare with Other	67.83	22.36	.00	6.52	3.28			
Medicare Only	55.57	5.40	17.78	12.63	8.62			
Other Health care without Medicare	49.94	11.32	17.20	20.14	1.39			
Mexico								
IMSS						46.01	54.69	1.51
ISSSTE						22.18	7.38	1.54
PEMEX						3.18	.00	.00
Private						3.30	10.30	29.75
Other						25.33	27.63	67.20

Table 3.4 Weighted Logistic Regression Results for Self –Assessed Health at Time 2 and Healthcare Coverage for Older Mexicans in the United States (Hispanic EPESE– top) and Mexico (MHAS – bottom) (Reference Category-Excellent /Good) ††

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**	
United States	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.207	1.874***	1.202	1.931***	1.252†	1.831***	1.276*	1.812***	1.234†	1.910***
Healthcare Coverage (Medicare Only)										
Medicare with Medicaid					.877	1.688*	.971	1.709*		
Medicare with an HMO/Private Health care					1.331	.414*	1.346	.409**		
Medicare with Other Health care					.745	1.947	.755	1.924		
Other Health care without Medicare					3.513***	.656	3.363***	.688		
Years in United States (US Born)										
20 Years or Less							1.681*	.721	2.070***	.693
21 – 40 Years							1.541**	.609*	1.648***	.604*
41 – 60 Years							1.262	.829	1.367*	.826
61 or More Years							1.419	.848	1.357	.807
n	1648	1648	1648	1648	1648	1648	1648	1648	1652	1652
-2 Log Likelihood	2193.07	1259.75	2165.63	1231.25	2066.92	1185.2	2053.63	1179.80	2143.4	1225.19
Intercept	1.199**	.1315***	1.376***	.1057***	1.024	.0931***	.8522	.1067***	1.071	.125***
Mexico	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.818***	1.058	1.927***	1.246†	1.931***	1.460**	1.947***	1.464**	1.957***	1.242†
Health Care Coverage (IMSS)										
ISSSTE					.801†	1.068	.796†	1.053		
PEMEX					.851	.324†	.836	.325†		
Private					.489*	1.299	.525*	1.218		
Other					.855†	1.866***	.857†	1.869***		
Years Since Returned to Mexico (Never Been to US)										
More than 20 Years Ago							.267**	2.657	.276**	2.853
20 Years or Less							.108***	6.975**	.106***	7.428**
Years in United States (Never Been to US)										
Less than 10							1.994	.538	1.958	.494
10 or More							3.508*	.220*	3.238*	.231*
n	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	4045.52	3166.84	4017.97	3097.37	4008.28	3048.51	3959.68	3021.46	3967.83	3070.36
Intercept	1.273***	.2811***	1.166	.2890***	1.312†	.2037***	1.602**	.1749***	1.426*	.2491***

††All explanatory variables are from Time 1 unless otherwise specified; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10,
* p<.05, ** p<.01, ***p<.001

Table 3.5 Weighted Logistic Regression Results for Activities of Daily Living at Time 2 and Healthcare Coverage for Older Mexicans in the United States (Hispanic EPESE – top) and Mexico (MHAS – bottom) (Reference category–3 or more) ††

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**	
United States	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.473***	.558***	.408***	.505***	.418***	.506***	.417***	.507***	.404***	.504***
Healthcare Coverage (Medicare Only)										
Medicare with Medicaid					.799	.822	.769	.795		
Medicare with an HMO/Private Health care					1.534	1.332	1.498	1.291		
Medicare with Other Health care					1.095	.931	1.039	.877		
Other Health care without Medicare					.686	1.516	.664†	1.476		
Years in United States (US Born)										
20 Years or Less							.932	.857	.821	.912
21 – 40 Years							.779	.758	.726	.781
41 – 60 Years							1.087	.966	1.002	.974
61 or More Years							.639†	.620†	.677	.620†
n	1648	1648	1648	1648	1648	1648	1648	1648	1652	1652
-2 Log Likelihood	1466.8	1017.0	1336.59	935.91	1323.59	927.28	1318.73	923.83	1331.85	932.56
Intercept	5.794***	10.92***	11.39***	20.57***	13.21***	20.18***	14.46***	22.73***	12.65***	22.31***
Mexico	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.712**	1.698***	.628***	1.728***	.600***	1.850***	.611***	1.837***	.640***	1.735***
Healthcare Coverage (IMSS)										
ISSSTE					.944	.698†	.956	.705		
PEMEX					.947	.615	.936	.612		
Private					1.460	.101*	1.652	.100*		
Other					.834†	1.144	.841	1.145		
Years Since Returned to Mexico (Never Been to US)										
More than 20 Years Ago							2.229	2.583	2.084	3.051
20 Years or Less							1.404	2.030	1.314	2.270
Years in United States (Never Been to US)										
Less than 10							.622	.480	.673	.387
10 or More							.405	.577	.463	.470
n	2538	2538	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	3235.53	2248.81	2980.18	2129.84	2975.71	2112.53	2970.01	2110.61	2975.04	2127.59
Intercept	3.514***	.1308***	10.87***	.0268***	11.87***	.0277***	2.645***	.0265***	10.41***	.0262***

†† All explanatory variables are from Time 1 unless otherwise specified; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Chapter 4: Money Isn't Everything; Or Is it? —Economic Resources

4.1 Introduction

Migration from Mexico to the United States is said to be motivated by an economic imbalance between countries that sets people in motion in search of financial resources unattainable in their place of origin (Massey et. al. 1994). Although migration does improve the economic circumstances for Mexican immigrants to the United States relative to their country of origin, the Mexican origin population in this country continues to be overly represented among this nation's poor (Mendelson, Aronow, and Ahn 1998). Despite this higher propensity to live in poverty, Mexican Americans and Mexican immigrants have health and mortality profiles similar to their more advantaged Anglo-white counterparts in the United States (Elo, Turra, Kesterbaum, and Ferguson 2004). Because of this unusual pattern, economics play an essential part of this project and will be the focus of this chapter.

This chapter evaluates how economic resources may or may not benefit older Mexicans in the United States and Mexico. Continuing with the Hispanic EPESE from the United States and the MHAS from Mexico datasets, I will make comparisons between countries, using income, current employment, and type of housing. I will focus on the same dependent variables as in the previous chapters: self-assessed health, functional status, and mortality. This analysis will be pivotal to my discussion of the relationship between diabetes health and resource access since economics are central to the epidemiological paradox debate and are the primary reason for migration from Mexico to the United States.

4.2 Background

4.2.1 Operationalizing the Relationship between Health and Economics

The role of economics is more complex than simple access to formalized healthcare services that are associated with employment activity (Mathieson, Kronenfeld, and Keith 2002). For example, the type of work one does in the United States will determine how much income one makes (Arendt 2005), how long one continues in the labor force (Blekesaune and Solem 2005), and what type of occupational hazards one is exposed to (Berney, Blane, Smith, Gunnell, Holland, and Montgomery 2000). The employment pathway that one chooses or is streamlined into has long-term effects on health over the life course (Arendt 2005; Nordstrom, Diez Roux, Jackson, and Garden 2004).

Mexican Americans and Mexican immigrants are frequently employed in jobs that are low paid, physically intensive, and sometimes even life-threatening (Villarejo 2003). This type of lifestyle can have consequences on health and have an effect on the quality of life in later years (Angel, Frisco, Angel, and Chiriboga 2003; Berney, Blane, Smith, Gunnell, Holland, and Montgomery 2000; Zunker, Rutt, and Cummins 2004). The lack of access to income may prevent the older Mexican-origin population in the United States from having the capacity to purchase health-preserving medications or products only available to those with greater means. Over the years, this problem may have an impact on actual health or perceptions of health for those without financial resources.

The amount of financial resources a family or individual has is also an important determinant of the type of neighborhood in which one lives (Iceland, Sharpe, and

Steinmetz 2005; Wilson 1987). Living in an exclusive neighborhood may offer a protective gate, pools, and even golf courses. Living in a disadvantaged neighborhood, on the other hand, exposes inhabitants to environmental hazards (Berney, Blane, Smith, Gunnell, Holland, and Montgomery 2000), crime (Dobrin, Lee and Price 2005), and suboptimal housing (Morton, Allen, and Lee 2004). Although there is little information on the health benefits of living in a wealthy neighborhood, evidence suggests that disadvantaged neighborhoods have an effect on physiological and psychological health (Hill, Ross, and Angel 2005; Browning and Cagney 2003). Therefore, the Mexican-origin population living in this country is not only forced to take jobs that put them at health risk, but are also overly represented in neighborhoods and housing that expose them to elements that may compromise their health.

4.2.2 Economics as an Incentive to Return Migration

In the United States there are some documented trends of return migration to place of origin and economics among our nation's older population (Serow 2003; Conway and Houtenville 2003). Unfortunately, there is little information on the relationship between economics, health, and return migration of Mexicans, and therefore, I must look to the literature on older Americans in general, as in previous chapters. The literature suggests that older adults move to maximize their economic reserves. For example, Duncombe, Robbins, and Wolf (2003) found that income-tax burden played an important function in the migration patterns of retirees, in that higher taxes serve as an incentive for outbound migration for many older Americans.

Limited studies have also shown what role economic plays in return migration of Mexican migrants to their place of origin in Mexico (Lindstrom 1996). For instance, Reagan and Olsen (2000) found that return migration was more likely to occur if there was an economic push from the United States and a pull from Mexico. If it was likely that Mexicans would have a better standard of living in their place of origin than in the United States, then they were more likely to return. On the other hand, those who were receiving benefits from welfare programs in the United States were less likely to return to Mexico because there was no financial reason to move.

Although a pattern of migration among our nation's retirees and Mexicans who have migrated to the United States exists with respect to economics, we still lack information on where chronic illnesses, such as diabetes, fit into this picture. Caring for diabetes can be costly, regardless of which country one resides in. Not having access to economic resources in the United States may be incentive to move. Moreover, if there is an economic benefit in Mexico for diabetic health, this benefit may be reason to return to place of origin.

4.3 Research Objectives

The last two chapters focused on how family resources and health care might influence the health of older Mexicans with diabetes. This chapter is different from the others because economics is the only resource that serves as the primary incentive for the migration of Mexicans to the United States (Massey et. al. 1994). Therefore, we should observe more dramatic effects in this chapter than in the others. If there is incentive to return from the United States, then we should observe a protective effect of economic

resources on diabetes health in Mexico. Moreover, we should observe a disadvantage in the United States.

The first aspect of the analysis will attempt to determine the relationship between diabetes health and economic resources in the United States and Mexico. Next, I will establish whether differences exist between countries in terms of diabetes health and economic resources and if there is a benefit of living in one country over the other for Mexicans with diabetes. Afterwards, while holding constant the effects of economic, I will analyze the question of whether migration moderates the relationship between diabetes health and economics. As with the preceding chapters, the design of the analysis is intended to shed light on the epidemiological paradox debate and determine if return migration to Mexico has benefits.

4.4 Data and Methods

4.4.1 Data

The data that I will use for this chapter comes from the Mexican Health and Aging Survey (MHAS) and the Hispanic Established Population of Epidemiologic Studies of the Elderly (Hispanic EPESE). The Mexican Health and Aging Survey is a nationally representative panel survey of Mexicans aged 50 and over and their spouses in Mexico from the year 2000 (N=15,186; diabetics n = 2420). Participants were recruited in conjunction with the 2000 National Employment Survey/ Encuesta Nacional de Empleo (ENE). Representatives of the Instituto Nacional de Estadística, Geografía, e Informática (INEGI) in Mexico, conducted interviews in the respondents' homes.

Respondents and their spouses answered questions regarding their demographic, health, family, and economic conditions, among other topics. A follow-up wave of interviews was conducted in 2003 with the individuals or a proxy respondent (N = 14,277).

The Hispanic EPESE is a cohort longitudinal study of older Mexican Americans living in the Southwest. The sample was selected using probability design of elderly Mexicans living in Texas, Arizona, California, Colorado, and New Mexico. The original data was collected in 1993–1994 and was followed by three subsequent waves (1995-1996, 1998–1999, 2000–2001). If a respondent was not located in person due to death or relocation, proxy information about him or her was collected from family or friends. Follow-up rates are nearly 86% of the original sample of 3,050.

Since the Hispanic EPESE dataset's age distribution is quite old (i.e. 70 years and older), this study limits cases to those older than 69 years in the MHAS dataset. Because of this limitation in age range and the attrition in subsequent waves, the final sample sizes for this analysis were 2,538 for the MHAS and 1,652 for the Hispanic EPESE. I will use individual level sample weights created by the principle investigators of the datasets for the entire statistical analysis using this dataset.

4.4.2 Variable Measurement

In order to present a more global picture of the moderating effects of economic resources on diabetes health of Mexicans, I have used three dependent health measures: self-assessed health, functional status, and mortality. First, self-assessed health was originally constructed using a five-category scale, ranging from excellent (5) to poor (1). However, the Hispanic EPESE does not include a Very Good category, so I categorized

Very Good with the Good category for the MHAS dataset to facilitate comparability. Furthermore, the low case frequency in the Excellent and Good groups required me to collapse the categories even further into three. The final variable, therefore, was Excellent/Very Good/Good, Fair, and Poor. Other researchers have used similar methods without compromising the reliability of the results (Cho, Frisbie, and Hummer 2004). I then created a dummy variable in which Excellent/Very Good/ Good serves as the reference category.

This study measures functional status by an index of questions related to ability to perform personal care or Activities of Daily Living (ADLs). Subjects were asked whether or not they had difficulty performing daily personal-care tasks (such as bathing). Five of the questions on each survey were comparable (yes = 1 /no = 0). The Hispanic EPESE dataset had an extra category called "grooming" that was not on the MHAS. I dropped this category to make the ADL variable comparable to the other dataset. I then summed up the total number of "yes" responses and assigned a value ranging from 0 to 5 to each subject, with higher score indicating more assistance needed. Because of the small range of numerical values for this variable and the fact that less than five percent of the subjects reported a score higher than three on both datasets, I used the categories of zero, one to two, and three or more. Finally, I created a mortality variable based on whether the subject was deceased (yes= 1) by the subsequent wave.

I measure economic resources as income, type of housing, and current employment status. The datasets I use are similar in many ways; however, economic measurement proved to be the biggest challenge. First, income is not equivalently measured in Mexico and United States. Minimum wage in Mexico is far less than in the

United States. Therefore, I created the income variable in a manner that was most appropriate for each dataset and the economic context of each country. For the MHAS dataset I coded the income variable as half the minimum wage (6000 pesos a year), the minimum wage (12000 pesos a year more or less), twice the minimum wage, three times the minimum wage, or four times the minimum wage. Originally, I planned to create a variable using twice the minimum wage as the basis for categorization. However, the vast majority of subjects in this sample fall well below the minimum wage, and therefore, I created a variable based on the frequency distribution of income earned by subjects in the sample rather than using the standard measure that has been utilized in other research (Potter, Schmertmann, and Cavenaghi. 2002).

Coding the income variable for the Hispanic EPESE dataset was more straightforward since a categorical variable had already been created. I use five categories for this analysis: $0 -4999, $5000–$9999, $10000–$14999, $15000–$19999, and $20000 and above. The final income variables for this analysis have limitations with respect to equivalence, and therefore the ability to make interpretations based on different income brackets in each country is limited. Nevertheless, we can get an idea the effect of this variable in individual country contexts. Finally, I coded type of dwelling as house, apartment, or other, with houses serving as the reference category, and I coded current employment as a simple dichotomous variable (yes = 1).

In order to evaluate the relationship between diabetes health and economic resources, I generated descriptive statistics using certain aspects of diabetes management and health status, such as diabetes status, use of oral glucose control medication, use of insulin injections, Body Mass Index (BMI), level of control over the diabetes, and

adherence to a diabetes diet, to test further the severity of the subjects' illness. Diabetes was coded as a simple dichotomous variable (yes = 1). With respect to the oral glucose control medication and insulin question on the Hispanic EPESE survey, there was one question that asked if subjects were taking insulin, diabetes medication, or both. I coded insulin as 1 if they were only taking insulin or if they were taking both, and coded diabetes medication only if they answered yes to diabetes medication but not both. Therefore, I established the variable as insulin or both in order to make it comparable to the Mexican dataset. In Mexico, the question asked if persons were taking insulin or oral glucose control medication; therefore, I created two separate categories as such.

I calculated body Mass Index (BMI) by creating a ratio of subjects' self-reported weight to their height for each country in its respective measurement system (i.e. kilograms versus pounds). I then divided respondents' BMI into five categories: underweight (BMI <19), normal weight (19<BMI<25), overweight (24<BMI<30), obese (29<BMI<40), and extremely obese (BMI>39). Finally, for the Hispanic EPESE dataset, I calculated BMI using averages for missing values, substituting missing values at Time 1 with averages taken from two times periods that were available for weight and height. I measured diet dichotomously according to whether subjects follow a special diet for their diabetes (yes = 1), and if subjects' diabetes was under control, I also measured dichotomously. Finally, for the regression analysis I use only diabetic status. This variable was measure as whether subjects have been told by medical personnel if they have diabetes (yes = 1). I was unable to distinguish between Type 1 and Type 2 diabetes from the variables that were available for analysis, which may create some bias in the findings. However, since the majority of adults in the United States have Type 2

(American Diabetes Association 2000) and it is unlikely that those who developed diabetes in childhood would survive to be older that sixty-nine, I make the assumption that the majority of subjects in these datasets developed diabetes as adults (i.e. Type 2).

My analysis is limited to the U.S.-born and Mexico-born. In terms of migration, I used history of migration, years lived in the United States, and years since returning to Mexico for this analysis. I measured migration to the United States as a dichotomous variable (yes = 1) and coded years lived in the United States as none, 10 years or less, and more than 10 years. Finally, I coded years since returning to Mexico as never going to the United States, 5 years or less, 6–10 years, 11–20, or more than 20.

In the multivariate analysis of the MHAS data using the functional status variables, I had to collapse categories for the years since returning variable, due to low cell size counts, to preserve the reliability of the results. This reduction resulted in three categories: never, more than 20 years, and 20 years or less. Although twenty years is a long period of time and limitations do exist with respect to interpretation, I felt that including such a variable in the model was better than completely eliminating it. In the United States, I categorized migration as U.S.-born, 20 years or less, 21 to 40 years, 41 to 60 years, and 61 years or more.

To account for the confounding effects of the major explanatory variable with primary demographic characteristics of the samples, I utilized Standard controls (i.e. sex, level of education, and age). Age is categorized as 70 - 75, 76 - 80, and 81+. Level of education is categorized as less than 7 years, seven to eleven years, twelve years, and more than twelve years, for the same reasons. Finally, I code gender as female = 1.

4.4.3 Analysis

In order to compare economic resources for Mexicans based on migration history, diabetes status, diabetes diet, diabetes medication, control of diabetes, and Body Mass Index, I produced cross tabulations to create proportions based on country of residence and length of time spent in the United States. Since the analysis is limited with respect to number of waves collected for the MHAS data and the dependent variables are categorical, I used simple logistic regression rather than hazard or growth curve models. Statistical models, therefore, for this analysis predicted self-assessed health and functional status at Time 2 (MHAS 2003; Hispanic EPESE 2001) by explanatory variables at Time One (MHAS 2001; Hispanic EPESE 1999).

To determine individual and full model effects on the dependent variable, I carried out a series of stepwise regressions using each dependent variable at Time 2. Chapter 2 reports the results from the unadjusted models for diabetes status and the model controlling for demographic characteristics, I will be including them in the textual discussion, but not in the table. Each model in this chapter controls for demographic characteristics. I introduce each economic variable to the model separately in order to capture the individual effects of each on the relationship between diabetes status and the dependent health variables. Model 1 controls for the current employment variable and Model 2 for income. Model 3 adds housing type and Model 4 migration history.

As in previous two chapters, I include migration in the full model (Model 4) and then separately with demographic controls (Model 6 in Chapter 2) in order to demonstrate any variation for migration status that may reflect an advantage and thus an incentive for return. I conducted regressions using the entire samples from the datasets,

comparing persons with diabetes to those that do not have the disease. Due to limitations in sample size of persons with diabetes, it was impossible to conduct a separate analysis using only this sub-sample, as I had originally anticipated. In order to compensate for this shortcoming, however, I conducted interactions with diabetes status and the explanatory variables.

The full models for each of the dependent variables are statistically represented by the following equations;

*Logit (ADL Status **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(employment status **Time 1**) + β(income **Time 1**) + β(type of housing **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

*Logit (Self-Rated Health **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(employment status **Time 1**) + β(income **Time 1**) + β(type of housing **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

*Logit (Mortality **Time 2**) = β(diabetes status) + β(gender) + β(age **Time 1**) + β(level of education) + β(employment status **Time 1**) + β(relative income **Time 1**) + β(type of housing **Time 1**) + β(time in the United States **Time 1**) +β(length of time since returning from the United States (Mexico only) **Time 1**)*

4.5 Findings

4.5.1 Descriptive Statistics

Table 4.1 presents the descriptive statistics for the diabetic management, diabetes condition, and economic variables for older Mexicans with diabetes living in the United States and Mexico. First, with respect to the currently employed, in Mexico most were

taking oral glucose-control medication (80.70 percent), whereas in the United States most took a combination of insulin with oral glucose control (86.96 percent). Furthermore, in Mexico the majority who were employed considered their diabetes to be under control (84.25 percent); however, in the United States only about two-thirds did (63.64 percent). Finally, in Mexico most older Mexicans with diabetes who continued to work were either normal weight (32.51 percent) or overweight (58.14 percent). Conversely, in the United States, older Mexicans with diabetes who were working tended to be overweight (37.50 percent) or obese (41.67 percent).

To turn our attention to income (Table 4.1), the greatest proportion of Mexicans with diabetes was taking either insulin or oral glucose-control medications in the middle-range incomes in Mexico. For example, 97.58 percent of those who were making three times the minimum wage were taking oral glucose control, and 88.06 percent making four or more times the minimum wage were taking the medication. In the United States, there was less variation by income, and about eighty percent of all Mexicans with diabetes were taking insulin and oral glucose control.

The majority of Mexicans with diabetes in Mexico considered their diabetes under control regardless of income. Conversely, in the United States, Mexicans with diabetes making more money tended to rate their diabetes as under control to a greater extent than the lower income groups. With the exception of the underweight, there does not appear to be a consistent pattern of income distribution and Body Mass Index among Mexicans with diabetes in Mexico or the United States. There was, however, a larger representation of underweight among the lower-waged groups in Mexico and the United States.

House dwellers in Mexico had a smaller representation of those on a diabetes diet (53.73 percent) and had a smaller proportion in the overweight and obese categories than the other two groups. Conversely, in the United States house dwellers had the greatest proportion on a diabetes diet (52.58 percent), but the other two categories did not fall far behind. In addition, in the United States house and apartment dwellers were mostly overweight or obese, forty percent of those in another type of housing were underweight.

4.5.2 Regression Analysis

4.5.2.1 United States

As Chapter 2 (Table 2.2) demonstrates, there was a significant effect of diabetes status on poor health in the United States (OR = 1.874 $p < .001$), but no effect on fair health. This effect on poor health increased with demographic controls (Table 2.2 OR = 1.931 $p < .001$). In this chapter, adding employment status had little effect on fair health (Model 1, Table 4.2), but increased the odds of poor health by 6. 2 percent (OR = 1.936 $p < .001$). Including income in Model 2 or housing type in Model 3 has no effect on the odds ratios. There are no significant interactions for poor health; however, a person with diabetes who lives in an apartment has odds of 4.168 greater of reporting fair health than a house dweller without diabetes.

Focusing now on functional status, having diabetes put older Mexicans at a reduced odds of needing no assistance (Table 2.3 Chapter 2; OR = .473 $p < .001$) and needing assistance with one or two ADLs (Table 2.3 Chapter 2; OR = .558 $p < .001$). Nonetheless, as Table 4.3 shows, in the United States employment, income, and housing

type did not have an effect on the odds ratio for diabetic status on Activities of Daily Living. Finally, persons with diabetes were at greater odds of mortality, but the effects were not significant in the unadjusted model (OR= 1.215) and the model adjusted for demographics (OR = 1.374) (Table 2.4, Chapter 2). Furthermore, no change to the odds ration occurred when I included economic resources in this chapter.

4.5.2.2 Mexico

In Chapter 2, Table 2.2, diabetic status was significant for fair health in Mexico (OR = 1.818 $p < .001$), and this effect increased with demographic controls (OR = 1.927 $p < .001$). Poor health was insignificant in the unadjusted model but became marginally significant with the addition of demographic controls (Chapter 2, Table 2.2 OR = 1.246 $p < .10$). Adding current employment to the model in Mexico in this chapter (Table 4.2, Model 1), increased the effect of diabetes status on fair health by 6.2 percent and reduced the effect on poor health to insignificance, a decrease of 5.7 percent from the demographic model in Chapter 2. Including income in the model (Table 4.2, Model 2) did not affect the odd ratios for fair or poor health, and in Model 3 the addition of housing type had a minimal effect on the odds ratios for self-assessed health. Interaction effects were significant for diabetes status and being currently employed for fair health only. For example, a Mexican living in Mexico with diabetes who was currently employed had odds of 5.140 greater of reporting fair health than an unemployed non-diabetic.

Chapter 2 (Table 2.3) demonstrates that having diabetes put Mexicans in Mexico at a lower odds of needing no help (OR = .712 $p < .01$) and at a greater odds of needing

help with one or two Activities of Daily Living (OR = 1.698 p <.001) in the unadjusted model. Adjusting for demographic characteristics reduced the odds of needing no assistance in Mexico by 8.4 percent (Table 2.3; OR = .628 p < .001) and increased the odds of needing assistance with one or two ADLs by 3.0 percent (Table 2.3; 1.728 p < .001). In Table 4.3 (Model 1), including current employment offset the effects of demographic characteristics by 4.1 percent for not needing assistance (OR = .669 p < .001) and by 6.0 percent (OR = 1.668 p < .001) for needing assistance with one or two ADLs. Adding income in Model 2 accounted for about 2 percent of the effect of diabetes status on not needing assistance (OR = .628 p < .001) and further reduced the odds of needing assistance with one or two ADLs by 7.2 percent (OR = 1.596 p < .001). Including housing type in Model 3 had no effect on needing no assistance, but reduced the odds of needing assistance with one or two ADLs by an additional 2.9 percent (OR = 1.567 p < .001). In sum, in the straight regression models, economic resources together accounted for 5.9 percent of the effect of having diabetes on not needing assistance and 16.1 percent of needing assistance with one or two ADLs. Interactions were significant for diabetes status and income in that a person with diabetes making minimum wage was .0942 percent less likely to need no assistance than their counterparts without the disease who made half the minimum wage.

Finally, having diabetes put a Mexican at significantly greater odds of mortality in both the unadjusted model (OR = 1.576 p < .001) and adjusted model for demographic characteristics (OR = 1.833 p < .001) in Mexico (Table 2.4, Chapter 2). In Table 4.4, including current employment reduced the odds ratio by 8.5 percent (OR = 1.748 p < .001, Model 1). In Model 2, income offset the effects of employment status by 10.1

percent (OR = 1.849 p < .001). Adding housing type changed the odds ratio for diabetes status by about 2 percent in Model 3.

4.5.3 Migration

The descriptive statistics in Table 4.1 show that in Mexico the majority of those who were currently employed had never been to the United States. Income had no real variation with respect to composition of migrants and non-migrants until the four times the minimum wage category. Migrants consisted of nearly forty percent of the subjects in this category. Furthermore, migrants had the greatest representation of house dwellers than either of the other categories. In the United States, immigrants represented about fifty percent of those currently employed and had an even distribution of different income levels. Immigrants, nonetheless, had a greater proportion of apartment dwellers and other type of dwelling than those living in a house.

In the United States, as shown in Chapter 2 (Table 2.4) and in this chapter, including migration status did not have a substantial impact on the effects of economics on diabetes status for self-assessed health (fair health OR = 1.234, p < .10; poor health OR = 1.910, p < .001) or Activities of Daily Living (no help OR = .404, p < .001 ; help with 1 or 2 OR = .504 , p <..001). Conversely, including migration status in the adjusted model for mortality (Model 6, Table 2.4, Chapter 2) reduced the odds ratio of diabetes status by 7.5 percent (Model 2 OR = 1.374; Model 6 OR = 1.299). Adding migration to the full economic model in Table 4.4 (Model 4) does not have an effect on the odds ratio for diabetes status (OR = 1.334, p < .10). Although migration status has little effect in Mexico, it appears that in the United States economics produce the effects of migration.

As further shown in Chapter 2, there was little change in Mexico in the odds ratios for diabetes status for self-assessed health (fair health OR = 1.957, $p < .001$, poor health OR = 1.242 $p < .10$), Activities of Daily Living (no help OR = .640, $p < .001$, help with 1 or two OR = 1.735 $p < .001$), or mortality (OR = 1.818, $p < .001$), from the model adjusted for demographic characteristic with the inclusion of migration history. In this chapter, the addition of economic variables significantly reduced the odds ratio for self-assessed health, but including migration offset these effects by ten percent (Model 3 OR = 1.446; Model 4 OR = 1.540). There were no significantly observable effects for functional status or mortality.

4.6 Conclusions

The two most striking findings with respect to economic resources and diabetes management are, first, that older Mexicans with diabetes who live in Mexico and continue to work have a greater propensity to consider their diabetes under control than their counterparts in the United States and, second, regardless of country, subjects in the lower economic brackets tended to be underweight. The first finding can be interpreted in two ways: First, older Mexicans living in the United States are more likely to be forced to work for economic reasons, even when they are physically ill, whereas Mexicans in Mexico are not. Second, older Mexicans living in Mexico have less knowledge of their actual health and think their diabetes is under control when it is not; because they do not have physiological symptoms, they think they are healthy.

With respect to the latter findings, those in the lowest economic brackets tended to be underweight in both countries, which may suggest that those who are less well-off

or in financial strain may have less ability to meet the necessary nutritional requirements to maintain proper weight. This trend may also occur because their low socioeconomic positions may cause stress (Hill, Ross, and Angel 2005), leading to poor appetite and associated weight loss.

As with the previous two chapters, the greatest effects on the relationship between diabetes status, self-assessed health, and mortality occurred in Mexico. Overall, current employment, income, and type of housing reduced the odds ratio for diabetes status on the dependent variables. Income had the greatest effect on functional status and mortality. In total, economics accounted for nearly six percent of the effects of diabetes status on needing no assistance and sixteen percent of needing assistance with one or two Activities of Daily Living. If one takes into account the whole economic picture, money does matter in terms of objective health and longevity in Mexico. Income determines what type of food, specialized equipment, or shoes one can afford to buy and determines who has access to medically-related resources that may improve the vitality of the older Mexican with diabetes. Not having those resources most likely takes a toll on diabetes health, causing decline in functional status and leading to premature mortality.

In the United States, the only economic variable of significance was current employment. Including employment in the model made older Mexicans with diabetes even more likely to report poor health. This effect may be both physiological and psychological, as other have observed (Blekesaune and Solem 2005). Waking up every morning to go to a job may take its toll physically on someone who is seventy or older, while at the same time, knowing that you have no other choice but to continue to work may have a psychological impact over time as well.

The analysis in this chapter showed little effect of housing type on diabetes status in the United States and Mexico. Living in an apartment is no different than living in a house in terms of diabetes health, but the fact there is no measure of the value of apartment or house, which may have had more of an effect on the health measures, limits this analysis. Someone who was retired might have moved into an apartment out of convenience, regardless of economic standing, or to make it easier to get around. Furthermore, in urban settings, particularly in Mexico, it is more of a norm to live in an apartment. Therefore, these factors may have influenced the results, thus yielding insignificant results.

In Mexico, outside of fair health, migration has no influence on the effect of economics on the relationship between diabetic status, health, and mortality. Overall, the economic resources that are obtained through migration may put older Mexicans living in their country of origin in the same financial position as someone who never went to the United States, making migration irrelevant. Interestingly, however, non-migrants are more likely to be currently working, but migrants have a greater propensity to live in houses and have higher levels of income. Migrants who return to Mexico may be in a better financial position than non-migrants, and this advantage thus has a positive effect on health because it increases access to medications and medical equipment. Whatever the case may be, migration in Mexico appears to have less to do with health selection and more to do with financial accumulation in the later years.

In the United States, a different picture emerges. Mexican immigrants over the age of seventy are more greatly represented among those who are still employed and who live in apartments. Migration, without economics, has a large effect in the logistic

regression model on diabetes status for mortality. Conversely, controlling for economics produces no effect. Thus, the disadvantage that is observed for immigrants living with diabetes in the United States is largely economic. This problem probably reflects the long-term effects of the inaccessibility of better paying jobs and health benefits for older immigrant Mexicans. Consequently, living in the United States may put an older Mexican at an economic disadvantage, which has negative consequences on diabetes health; however, living in Mexico may level the playing field between wealthy non-migrants and successful returning migrants.

Table 4.1 Weighted Distribution (in Percentage) of Economic Variables with Medication, Health Behaviors, and Migration Variables for Mexicans with Diabetes in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom)

United States	**Currently Employed**	**0-$4999**	**$5000–$9999**	**$10000 – $14999**	**$15000 - $19999**	**$20000+**	**House**	**Apartment**	**Other**
Taking Insulin (YES)	86.96	77.78	80.00	83.50	70.45	83.33	80.73	72.41	78.57
Taking Oral Glucose-control medication (YES)	13.04	22.22	20.00	16.50	29.55	16.67	19.27	27.59	21.43
Diabetes Under Control (YES)	63.64	43.48	42.13	53.92	65.12	56.25	47.03	55.17	72.22
On a Diabetes Diet (YES)	41.67	31.03	52.36	54.63	41.30	67.35	52.58	50.00	46.67
Body Mass Index									
Underweight	.00	34.48	13.78	11.11	6.52	10.20	11.74	10.00	40.00
Normal	16.67	17.24	17.72	15.74	19.57	22.45	18.31	16.67	13.33
Overweight	37.50	20.69	31.10	31.48	34.78	24.49	31.92	23.33	13.33
Obese	41.67	24.14	35.04	37.96	32.61	36.73	34.74	43.33	30.00
Extremely Obese	4.17	3.45	2.36	3.70	6.52	6.12	3.29	6.67	3.33
Years in United States									
US Born	50.00	58.62	54.33	68.52	63.04	57.14	60.33	43.33	53.33
20 Years or Less	12.50	3.45	9.06	4.63	8.70	2.04	6.34	6.67	16.67
21 – 40 Years	29.17	13.79	16.54	12.04	13.04	16.33	14.08	36.67	6.67
41 – 60 Years	.00	17.24	11.02	10.19	8.70	12.24	10.56	10.00	20.00
61 or More Years	8.33	6.90	9.06	4.63	6.52	12.24	8.69	3.33	3.33
Mexico	**Currently Employed**	**½ Min. Wage**	**Min. Wage**	**2X Min. Wage**	**3X Min. Wage**	**4X + Min. Wage**	**House**	**Apartment**	**Other**
Taking Insulin (YES)	10.81	10.03	12.89	.00	25.63	5.41	9.49	13.92	38.78
Taking Oral Glucose-control medication (YES)	80.70	86.70	95.69	100.00	97.59	88.06	89.80	69.60	100.00
Diabetes Under Control (YES)	84.24	91.30	99.71	87.51	100.00	100.00	91.63	100.00	100.00
On a Diabetes Diet (YES)	39.88	52.82	72.44	37.66	84.01	12.91	53.73	67.16	61.22
Body Mass Index									
Underweight	.00	4.58	.33	.00	.00	.00	.99	22.95	38.78
Normal	32.51	22.52	73.01	20.45	47.36	41.58	31.36	15.10	.00
Overweight	58.14	61.06	18.87	72.57	40.88	46.95	57.57	35.46	61.22
Obese	9.17	10.51	7.79	6.98	11.76	11.47	8.85	26.49	.00
Extremely Obese	.17	1.33	.00	.00	.00	.00	1.24	.00	.00
Years Since Returning To Mexico									
Never Been	88.60	91.66	99.48	100.	88.70	62.73	91.21	99.48	100.00
20 Years or Less	7.47	4.23	.00	.00	11.30	.00	5.65	.00	.00
More than 20 Years Ago	5.64	5.31	.052	.00	.00	37.27	4.25	.52	.00
Years in the United States									
Never Been	86.41	89.02	98.30	91.62	88.70	56.74	88.36	99.48	100.00
Less than 10 Year	8.86	8.27	1.25	.00	.00	5.99	3.72	.52	.00
10 Years or More	4.73	2.72	.44	8.38	11.30	37.27	7.93	.00	.00

Table 4.2 Weighted Logistic Regression Results for Economic Variables and Self –Assessed Health at Time 2 for Older Mexicans in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom) (Reference Category–Excellent /Good) ††

	Model 1		Model 2		Model 3		Model 4	
United States	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.192	1.936***	1.200	1.948***	1.198	1.927***	1.221†	1.912***
Currently Employed *(Yes)*	.632*	1.229	.625*	1.223	.627*	1.228	.574**	1.312
Income ($20000)								
0- $4999			.928	1.341	.876	1.417	.836	1.408
$5000–$9999			.917	1.262	.900	1.311	.882	1.310
$10000–$14999			.731†	.939	.727†	.935	.762	.888
$15000- $19999			.631*	1.423	.631*	1.404	.618*	1.405
Type of Living Arrangement (House)								
Apartment					1.011	.665	.914	.721
Other					1.321	.721	1.258	.750
Years in United States (US Born)								
20 Years or Less							2.088***	.660
21 – 40 Years							1.710***	.601*
41 – 60 Years							1.355†	.858
61 or More Years							1.402	.817
n	1652	1652	1652	1652	1652	1652	1652	1652
-2 Log Likelihood	2160.36	1230.77	2152.61	1227.30	2150.94	1224.08	2128.22	1217.90
Intercept	1.428***	.1039***	1.638**	.0879***	1.636**	.0922***	1.306	.1083***
Mexico	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**	**Fair**	**Poor**
Diabetes	1.989***	1.189	1.984***	1.186	1.990***	1.207	2.024***	1.192
Currently Employed (Yes)	.1456***	.537***	1.455***	.535***	1.446***	.522***	1.540***	.500***
Income (Half the Minimum Wage)								
One Time the Minimum Wage			1.321	.781	1.274	.759	1.350†	.735
Twice the Minimum Wage			1.086	.719	1.066	.717	1.044	.672
Three Times the Minimum Wage			1.340	1.087	1.308	1.066	1.445	1.004
Four or More Times the Minimum Wage			2.207**	.162**	2.182**	.152**	2.263**	.160**
Type of Living Arrangement (House)								
Apartment					1.192	.314***	1.156	.325***
Other					.500*	.075*	.509*	.071*
Years Since Returned to Mexico (Never Been to US)								
More than 20 Years Ago							.278**	2.300
20 Years or Less							.109***	5.795*
Years in United States (Never Been to US)								
Less than 10							1.786	.679
10 or More							2.814†	.299†
n	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	4002.11	3068.96	3991.90	3052.07	3985.75	3014.86	3929.85	2986.37
Intercept	.8940	.4347***	.8878	.4359***	.8806	.4584***	1.0593	.3975***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 1 is the unadjusted model without any controls; Model 2 through 4 are adjusted for demographic characteristics; Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001.

Table 4.3: Weighted Logistic Regression Results for Economic Resources and Activities of Daily Living at Time 2 for Older Mexicans in the United States (Hispanic EPESE – top) and Mexico (MHAS- bottom) (Reference category–3 or more) ††

	Model 1		Model 2		Model 3		Model 4	
United States	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.408***	.504***	.413***	.513***	.416***	.508***	.413***	.507***
Currently Employed (Yes)	.870	.731	.864	.708	.868	.713	.919	.742
Income ($20000)								
0- $4999			.959	1.039	1.051	1.094	1.006	1.036
$5000–$9999			.721	.611	.729	.629	.719	.614
$10000–$14999			1.122	.864	1.129	.864	1.101	.846
$15000- $19999			.895	.564	.901	.562	.891	.545
Type of Living Arrangement (House)								
Apartment					1.305	.890	1.370	.925
Other					.673	.739	.684	.744
Years in United States (US Born)								
20 Years or Less							.869	.984
21 – 40 Years							.734	.812
41 – 60 Years							1.005	.978
61 or More Years							.669†	.630
n	1652	1652	1652	1652	1652	1652	1652	1652
-2 Log Likelihood	1336.38	935.23	1330.04	929.46	1326.06	928.51	1321.56	925.53
Intercept	11.52***	21.11***	13.62***	29.45***	13.31***	30.06***	14.72***	32.51***
Mexico	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**	**0**	**1-2**
Diabetes	.669**	1.668***	.689**	1.596**	.687**	1.567**	.694**	1.574**
Currently Employed (Yes)	3.309***	.589**	3.401***	.582**	3.431***	.580**	3.411***	.572***
Income (Half the Minimum Wage)								
One Time the Minimum Wage			.562**	2.522***	.554**	2.561***	.551**	2.521***
Twice the Minimum Wage			.622†	1.363	.595†	1.422	.629	1.515
Three Times the Minimum Wage			.393*	.031	.399*	.030	.410*	.030
Four or More Times the Minimum Wage			1.994*	.331*	2.080*	.313*	2.160*	.305*
Type of Living Arrangement (House)								
Apartment					3.577***	.086***	3.567***	.086***
Other					.702	1.244	.684	1.218
Years Since Returned to Mexico (Never Been to US)								
More than 20 Years Ago							2.181	3.113
20 Years or Less							1.620	1.962
Years in United States (Never Been to US)								
Less than 10							.549	.421
10 or More							.469	.547
n	2538	2538	2538	2538	2538	2538	2538	2538
-2 Log Likelihood	2901.9	2119.17	2881.87	2086.33	2852.08	2049.68	2848.87	2046.90
Intercept	5.664***	.0373***	5.776***	.0374***	5.540***	.0399***	5.487***	.0383***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 2 through 5 are adjusted for demographic characteristics (which are not shown); Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Table 4.4 Weighted Logistic Regression Results for Economic Resources and Mortality by Time 2 for Older Mexicans in the United States (Hispanic EPESE–top) and Mexico (MHAS- bottom)††

United States	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Diabetes	1.373†	1.353†	1.336†	1.334†
Currently Employed (Yes)	.921	.926	.922	.908
Income ($20000)				
0- $4999		2.561*	2.688**	2.790**
$5000–$9999		1.810*	1.895*	1.949*
$10000–$14999		1.860*	1.890*	1.886*
$15000- $19999		1.164	1.164	1.202
Type of Living Arrangement (House)				
Apartment			.713	.744
Other			.722	.741
Years in United States (US Born)				
20 Years or Less				.968
21 – 40 Years				.920
41 – 60 Years				.756
61 or More Years				1.446
n	1876	1876	1876	1876
-2 Log Likelihood	1172.96	1163.55	1161.21	1156.91
Intercept	.0277***	.0159***	.0163***	.0168***
Mexico	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Diabetes	1.748***	1.849***	1.828***	1.822***
Currently Employed (Yes)	.443***	.442***	.444***	.448***
Income (Half the Minimum Wage)				
One Time the Minimum Wage		.383**	.378**	.387**
Twice the Minimum Wage		1.373	1.353	1.292
Three Times the Minimum Wage		.456	.463	.457
Four or More Times the Minimum Wage		.841	.856	.849
Type of Living Arrangement (House)				
Apartment			1.495†	1.493†
Other			.628	.638
Years Since Returned to Mexico (Never Been to US)				
More than 20 Years Ago				
20 Years or Less				
Years in United States (Never Been to US)				
Less than 10				
10 or More				
n	2858	2858	2858	2858
-2 Log Likelihood	2139.83	2128.33	2123.95	2121.50
Intercept	.1190***	.1142***	.1114***	.1129***

†† All explanatory variables are from Time 1 unless otherwise specified; Model 2 through 5 are adjusted for demographic characteristics (which are not shown); Reference categories are in parentheses; All results are reported in Odds Ratios. † p<.10, * p<.05, ** p<.01, ***p<.001

Chapter 5: Ario de Rayon and El Llano, Michoacán—Two Case Examples

5.1 Introduction

To date, researchers in this country have made little effort to understand the relationship between migration and health from the Southern side of the U.S.-Mexican border. Moreover, all known studies that have investigated the "epidemiological paradox" have used quantitative methods in the primary study design. This study, therefore, has an advantage over other studies simply because of the utilization of bi-national data and qualitative methods.

In the previous chapters, overall, the majority of the effects that were observed with respect to diabetes status and health were in Mexico. For example, the chapter on family resources results showed that being in a marital relationship or having family support is not protective, but Mexicans in Mexico may be worse off if they are not married. In the healthcare chapter, although there was not a significant effect of migration history on the model, migration selects older Mexicans living in Mexico into a type of healthcare program by their lack of work history in that country. Finally, in the economics chapter the greatest effects were again observed in Mexico, and current employment and income reduced the odds ratio for diabetes status on all three dependent variables. The findings from the quantitative chapters suggest that Mexicans who have diabetes and return to Mexico after living in the United States may put themselves at a disadvantage overall when it comes to resources and physiological health. The primary objective of this chapter is to attempt to explicate these findings.

Paloni and Morenoff (2001) take issue with our repeated efforts to track the paradox and our complete failure to explicate the paradox due to the repetition of modeling and research design. Using a combined approach will speak to this criticism and hopefully will give insight into the "why" and "how" of return migration to Mexico and the "epidemiological paradox." The combination of quantitative and qualitative is not new and has been implemented in a number of studies in Mexico, filling in the gaps one or the other has left behind. One such study by Aguilera-Guzmán et. al. (2004) looks at the psychological consequences on teenagers of parental absence as a consequence of migration from Mexico to the United States. Using the data from in-depth interviews and a survey that was administered to school children in four communities in the state of Zacatecas, this group of researchers were able determine that the stress teenagers in these communities experience is not primarily due to the absence of the migrant father but rather the result of gender-role expectations that encourage youth to journey to the north also when they become adults.

In another study on diabetes, Daniulaityte (2004) used a mix-method approach in Guadalajara, Jalisco, to investigate the cultural influences on adjustment to the disease. She examines cultural factors that contribute to the understanding of the disease process of diabetes among Mexicans living in an urban setting. She found from her quantitative analysis that women are more likely to share information about their disease with each other than men were. From her in-depth interviews she found that many believe that their diabetes is the result of "susto," a fright that caused such emotional distress that it elicited a biochemical response in their body and thus caused their illnesses. Putting the two

results together, she was able to capture a much richer understanding of how Mexicans interpret and share information about disease.

In both of the above studies the researchers were able to respond to the major criticisms of each methodological perspective by using a mixed-method design. They had the reliability of statistics coupled with the richness of the results from their in-depth interviews. Up to this point, my dissertation provided information on some major trends in the health of older Mexicans with diabetes living in Mexico and the United States, but it stops short in not describing the processes that are involved for these trends to occur. This chapter is intended to pick up where the others left off and give more insight through the results of a qualitative study in Michoacán, Mexico.

5.2 Research Objectives

There is great debate in the sociological world regarding the utility of quantitative versus qualitative methods of research methods (Ragin 2004). On the qualitative side, criticism focuses on the inability of quantitative methods to capture detailed information on processes or relationships between variables. Quantitative researchers take issue with the capacity to generalize findings from case studies and other similar qualitative techniques. The problem with the quantitative preference that we as scientists have used in trying to explain the "epidemiological paradox" is that although we have been able to track the phenomenon, we have done little to answer "why" or "how."

5.3 Methodology

5.3.1 Study Design

I designed this aspect of my dissertation project to complement the data analysis chapters by taking a more in-depth look a one or two migrant communities in Mexico to contextualize the relationship between migration and health and to capture perceptions of those who reside in these locations. The methods for this phase of the study were twofold: in-depth interviews using a thirty-eight question instrument and observation of the day-to-day operations of the communities under investigation. Interviews are the optimal method for this type of research due to the sensitivity of the topic of health. Using private interviewing techniques allows for better protection of privacy as opposed to focus groups or other similar qualitative methods.

5.3.2 Location of Interviews

The locations for this project were two small towns outside of Zamora, Michoacán (Ario de Rayon and El Llano). I selected this region because of its location in an area of Mexico in which migration is most prevalent and long-standing (i.e. West Central Mexico). This site would enable easier access to migrants who have returned from the United States and are in their later years of life. Initially the plan was to conduct interviews in as many different locations as possible; however, obtaining contacts and confidence in migrant communities, as an obvious outsider, proved to be more difficult than originally anticipated. In addition, after spending some time in Zamora, I felt that in order to get the type of quality of information that I desired, it was important for me not only to spend time getting to know the interviewees, but also to try to understand what it was like for them to live day to day.

5.3.3 Participant Recruitment

At first I had intended to interview only older Mexicans to complement the data analysis, since it was limited to seventy years or older. As I began to conduct interviews, however, I came to realize that migration activity as it pertains to diabetes health depends heavily on what period of life the subject is in. Motivations for going to and returning from the United States are dependent upon one's age, responsibilities, and the resources that are available in both countries. Therefore, I made the decision to include persons with diabetes from every age group.

I located subjects through academic contacts at El Colegio de Michoacán, medical providers in the area, and informal contacts in the area. Each method has its benefits and drawbacks. First, academic contacts may have ample knowledge with respect to scientific method but may lack direct links to the community. Medical providers have contacts primarily with the clientele that they see and may not have information about other types of groups living in their community. For example, IMSS is the primary healthcare provider for the employed population in Mexico. Although IMSS serves many people, there are many Mexicans without formal employment. Finally, informal contacts may not have the knowledge base of illnesses and therefore may not have a good understanding of what type of information is needed to conduct this type of interview. Despite the weaknesses, the combination of contact sources offset each bias and created a sample of participants more diverse than if I had used only one.

5.3.4 Participant Description

I interviewed a total of 37 subjects, whose ages ranged from 48 to 90, with most in their sixties. The majority were women (25) due to their greater willingness to share information about their health with an outsider. This gender imbalance is a definite drawback to the report, but it also provided an advantage since women are more likely to care for the health of their spouses as well as themselves and are able to give more in-depth information about both. The women I interviewed shared information about themselves and their spouses when it related to the study. Finally, of the 37, 18 subjects migrated to the United States at least once in their lives. The others had the minimum of one family member living in this country. The information received from the non-migrants was also important because most received some monetary benefit from loved ones living on the other side of the border.

5.3.5 Instrument

The instrument I used for the in-depth interviews had a total of thirty-eight questions (See Appendix B). Questions addressed five different themes: First, questions related to subjects' diabetes condition, for example, how long have they been diagnosed with the disease, what medications they take, and how often they check their blood sugar. I also asked if they have other related conditions, such as heart disease or peripheral vascular disease. This set of questions served as an indication of the severity of the subject's diabetes condition and debilitation.

Next, in order to determine what social, financial, and family resources are available to Mexicans in the United States and Mexico to manage their diabetes, I presented questions related to past experiences with resources in the United States and

Mexico to care for diabetes. This set of questions was intended to identify variations between countries with respect to resource access, as well as identify potential barriers.

In addition, I also asked general questions with respect to length of time, type of work, and whether family live in the United States. The rationale for this line of questioning is that it establishes how connected a Mexican who has returned to Mexico is with the social resources and economic opportunities in the United States. In addition, the interview involved questions that addressed how Mexicans with diabetes utilize resources and which they find to be most important to their health. The intent of these questions was to establish which strategies are utilized to care for diabetes communities and to determine which resources are deficient and for whom.

Finally, in order to determine what relationship migration has to diabetes health in Mexicans in both countries, I asked questions about experience accessing treatment in the United States and Mexico. These questions enabled me to better determine if Mexicans return to Mexico because they cannot access necessary services in the United States and what factors are important determinants in the process.

5.4 Findings

5.4.1 Description of the Communities

The timing of a visit plays a very important role in data collection in migrant communities in Mexico. When I visited this community for the first time in the fall, there were many more people than when I returned in the summer. Migrants begin leaving their communities for the United States after the Christmas holiday, and the majority of

those who make the journey are gone by summertime. As a result, when I returned in July, many houses were locked up awaiting their families' return in December.

El Llano is a community that is much more experienced with migration. People reportedly have been migrating from this community to the United States since the late 1800s. As a result, there are more economic resources in El Llano than in Ario de Rayon. This difference is quite apparent when you enter the community through its grand entrance that welcomes you to the town. As you make your way into the community, you realize that the houses are much bigger and further along in construction than in Ario de Rayon. What is most noticeable about El Llano in the middle of the summer is the lack of inhabitants. Neighbors told me that most people have their entire families living in the United States and come back during Christmas to visit extended family and parents. This migration is an important factor because if migrants are returning to Mexico when they become ill in towns such as El Llano, to whom are they returning?

Ario de Rayon is a newer migrant community than El Llano, as the larger number of half-finished houses and the greater number of people sitting in front of their homes and in the streets immediately make evident. Through door-to-door interviews I also realized that this community has a large number of households temporarily headed by females. This is an important distinguishing factor from El Llano and suggests that when we consider whether a Mexican migrant in the United States might return to Mexico, we must take into account the stage of the migration process the community of origin is in.

5.4.2 Migrant Typology

Before continuing on to resource utilization, it is first important that I characterize the type of migrants who exist with respect to return migration and health. Researchers have previously classified Mexican migrants as permanent and temporary (Lozano 1993); however, with respect to health and aging, the relationship is more complex in Ario de Rayon and El Llano. Just as migrants head to the United States to maximize their economic standings, when it comes to health and years of retirement, similar strategies apply. In my research I encountered three basic types of return migrants, which I characterize as: "Temporary Tune-ups," "Returning Retirees," and "Mexican Snowbirds." The subsequent sections describe each.

5.4.2.1 Temporary Tune-Ups

When serious illness strikes, many migrants have no choice but to return home to Mexico to receive treatment. I refer to this group as "Temporary Tune-ups." The primary objective of migration from Mexico to the United States is to improve the economic well-being of individuals and families. Many Mexicans migrate seasonally, leaving behind family members to care for the home they are in the process of building and children who are not of working age. The longer they are able to stay, the more money they are able to earn. They most often work in agriculture or other jobs that usually do not come with the healthcare benefits associated with higher levels of employment in the United States. Furthermore, this type of work does not provide sick days, which means if migrants become ill, they lose money every day that they are sick. They return to Mexico to get treated medically with the intent to return to the United States when they are well.

One example of the "Temporary Tune-up" is Juanita, a married 74-year-old woman with diabetes (her real name has been changed), who lived in the United States for twenty years. She and her husband relied primary on the insurance benefits they received through his employment in this country. However, her husband was laid off and shortly thereafter diagnosed with prostate cancer. They applied for public health assistance with the state of Illinois, but the state would not pay for the surgery or chemotherapy because they are not urgent procedures and the migrants could only qualify for emergency care due to their non-resident status. Juanita and her husband had no choice but to return to Mexico. At first, after the husband recovered from his illness, they planned to return to the United States, but they eventually decided to reside permanently in El Llano because, as they put it, it is "más tranquila" (more calm). Juanita also stated that their money goes a lot further in Mexico, which was also a factor in their decision to stay in El Llano. Another example of a tune-up return is sixty-one-year-old diabetes male Ricardo, who made eleven trips to the United States. He returned to Mexico for heart surgery and was never able to make it back because his health declined after the surgery and he was unable to work.

I received many secondhand reports from many community members of people who return because of illness and go back to the United States afterwards, but never had the opportunity to interview anyone directly. For this subgroup the migrants' time in the United States is shortened because they are unable to access health care there. If a migrant returns for health reasons, he or she may choose to stay because of better economic standing in Mexico. Another scenario is that they are forced to stay because the decline in health prevents them from returning to the physically intensive employment

they did in the United States prior to their illness. In either case, there is not an original intent to return to Mexico on a permanent basis.

5.4.2.2 Returning Retirees

Many former migrants living in El Llano and Ario de Rayon were either temporary migrants, spending years of their life going back and forth between countries, or permanent migrants who raised families in the United States and chose to retire in Mexico with the pensions and savings they earned. This group may have health problems currently, but health was not the deciding factor for return. For that reason I refer to them as "Returning Retirees."

One example of this type of migrant was previously mentioned in the section above. Although health problems was the precipitant for her return, after being in El Llano, Juanita and her husband decided that their quality of life was better in Mexico than in the United States and chose to spend their "golden years" in their community of origin. Another example is a 62-year-old man (Pablo) with diabetes who worked as a garbage man for many years in Santa Barbara, California. Pablo receives a pension from this company, and although he received medical benefits while working, he does not have health insurance as a retiree. He stated that he stopped working for this company because he developed back problems which prevented him from lifting heavy objects. Now he works as a gas line repairman in his town of origin, but states that his pension gives him the flexibility that he needs with his diabetes not to work when he is feeling ill. Living in Mexico allows him that option.

Contrary to the “Temporary Tune-ups,” the “Returning Retirees” have the intent to return on a permanent basis to their places of origin in Mexico. Another important distinguishing factor is that illness is not the precipitant for return. This group returns because they want to or because they can make their dollars last longer by living in a place where the cost of living is less.

5.4.2.3 Mexican Snowbirds

As previous literature has documented, just as other Americans in the United States spend their winter months in warmer climates, so too do older Mexican immigrants make the journey south, but for them it is south of the border. I encountered a number of “Mexican Snowbirds” who immigrated to the United States earlier in life, had their families, and return to Ario de Rayon or El Llano every winter to visit with relatives. Many have MediCal, which is the public assistance program in California. The prescription program allows them to receive up to three months of medications in advance, which enables them to spend long periods of time in Mexico without having to return back to California or purchase medication during their stay.

One married couple I interviewed, both with diabetes, spends four to six months in Mexico every year. They have MediCal, which they are both happy with because it pays for all their medical expenses and prescription medication. They report that if they had an emergency, they would see a doctor in Mexico, but in general they receive all their medical care in the United States. Another subject I interviewed had about the same story; she spends three to four months in Mexico with her husband, receives MediCal for

the treatment of her diabetes, and returns to the United States after the holidays to be with her children.

The “Mexican Snowbirds” are dissimilar to the other two groups in that they are temporary returns to Mexico and permanent immigrants to the United States. They are similar to the “Returning Retirees” in that they are healthy, but like the “Temporary Tune-ups,” they have no intent to return permanently to Mexico. I did not encounter a “Mexican Snowbird” that turned into a permanent “returner”; however, they may exist.

5.4.3 Resource Utilization

Now that I have classified return migrants, we can begin to explore how resources may influence this process. This next section will address this question by looking at family, health care, and economic resources and how a migrant may or may not benefit from each.

5.4.3.1 Family

Family is believed to be one of the primary drawing forces back to Mexico for the Mexican migrant. The findings from this investigation do not negate the idea that Mexican families in Mexico are close and members rely on each other significantly for survival. However, this relationship is complex, and migrants may return to Mexico to receive the emotional support of family, but monetary support is usually received from the other side of the border. I include both migrants and non-migrants in this aspect of the report, because there are important distinctions that may serve as disincentive to return to Mexico for a migrant who has family in the United States.

5.4.3.1.1 Healthcare Logistics

An important resource that family members usually provide is day-to-day assistance with the logistics of caring for the health of the person with diabetes. This care may include providing transportation to a doctor's appointment, picking up medication at the pharmacy, or even preparing a meal when one is sick or otherwise unable to. For persons with diabetes living in these communities, family members offer support when they can, but when acute illness strikes and persons with diabetes need to see a doctor, someone needs to take time away from work, which, needless to say, has a negative effect on the household income.

Many reported to me that they would prefer to find a way to deal with their health on their own rather than involve a family member. For example, Marianna, a fifty-six-year-old married, non-migrant woman with diabetes stated that she does not like to ask her children for help because "they have their own lives" and she doesn't want to impose herself on them. Another I interviewed, Juan, a sixty-four-year-old married, non-migrant male, stated that his diabetes is "his problem" and he doesn't like to rely on the help of others in his family, including his wife. Alexandra, who is seventy-three years old and unmarried, told me that when she becomes ill with her diabetes, she relies primarily on her neighbors because her daughters are all married and she cannot ask them. Finally, Josefina, a sixty-six-year-old unmarried persons with diabetes, states that she asks her unmarried daughter because she does not have family responsibilities like the others. In sum, requesting children for assistance with the care of the subjects' diabetes seems to be

done as a last resort to avoid imposing on their other responsibilities, and is decided upon based on who has the least obligations (i.e. the child that is still single).

5.4.3.1.2 Transnational Families

Another important factor that I identified through the interview process was that regardless of whether the person with diabetes himself or herself migrated, many families are transnational and have family members who live in the United States. This phenomenon creates a barrier to the utilization of family members to assist with day-to-day care merely by the inconvenience of distance. For instance, Gloria is a seventy-one-year-old female with diabetes who states that she can depend only on her husband to help her when she doesn't feel well because her siblings and children live in the United States. Lucinda, who would be classified as a "Mexican Snowbird," visits her sister during the winter months in El Llano, but her sister is also sick and does not have the physical reserve to assist Lucinda when she is ill. Lucinda's children and grandchildren all live in California and do provide assistance when she is in the United States, but for obvious reasons are unable to do so while she visits in Mexico. For those who live in the United States, therefore, moving to Mexico is illogical, since they would be losing the important resources that may be offered by offspring left behind.

5.4.3.1.3 Household Burden of Illness

Migration, for most, is about improving a family's or individual's economic status (Massey et. al. 1994). Many households in Ario de Rayon and El Llano have at least one family member who is in the United States working and contributing to the household

income from afar. In addition, there may be household members working in the community as employees or business owners. Finally, there may be member whose function is to stay in the home and care for the children or the day-to-day operations of the household. Everyone has his or her role in the functioning of the home.

In these communities, being stricken with a chronic disease damages a person's pride. Mexicans, young and old, participate in the economic functions of the home. It is in many cases a matter of survival. When one member is unable to do his or her part, others need to fill in and support that member economically. This situation instills a large amount of guilt for the Mexican with diabetes. Asking a daughter for a ride to the doctor means that she is most likely going to lose at least a half a day's pay.

5.4.3.2 Healthcare Coverage

5.4.3.2.1 Public Health Care –Mexico vs. United States

I will begin my discussion of healthcare access with a comparison of the migrating poor to their non-migrant counterparts. Mexicans residing in Mexico all qualify for public health services, as outlined in Chapter 3. Usually services are very basic, and often clinics are short of supplies and medications. On the other hand, if an immigrant to the United States has resident status, he or she is eligible for public assistance in the state in which he or she lives, which usually provides basic medical coverage, preventative care, and more importantly, pharmaceutical coverage. So to be poor in Mexico means you may or may not have health care or the medications you need, but in the United

States if you are in the same position, at least you have access to your meds and some health care.

The public clinic in Ario de Rayon has a monthly diabetes clinic day on every first Tuesday of the month. It is very crowded and most often visited by the population without any other alternative healthcare program. In addition to providing a medical exam by a physician, the clinic gives its patients a free one-month supply of medications. The problem with this system is that there is a greater demand than there are resources. Most patients come an hour before the clinic opens to ensure that they will receive their free medications. Many come early hoping to get their meds, but leave empty-handed.

In theory this system is good because it reaches most that do not otherwise have healthcare coverage, but it is flawed by the fact that it forces patients into non-compliance. First, many patients do not receive medications because the clinic simply runs out. Second, patients are frustrated by having to get up early to wait hours to see a doctor and choose not to go. One woman I interviewed, Elizabeth, a fifty-year-old with diabetes, put into perspective for me very eloquently how many feel about coming to the clinic once a month. She states, “our husbands earn 100 pesos a day and we need to pay for food, schooling for our children, and our medicine, and it is for that reason we come here to this clinic.” Given an alternative, most would go elsewhere.

This attitude contrasts to what some of the “Mexican Snowbirds” I interviewed had to say about their experiences with the public health system in California. Irma and Ernesto are a married couple, both with diabetes, who come to Mexico in December to visit Irma’s family. They have been living in the United States since the 1970s and have children and grandchildren who live nearby in Santa Barbara, California. They are both

on MediCal, the public healthcare program in California. They state that they are very happy with the service of MediCal because it "pays for everything." Irma boasts that this program even pays for two pairs of shoes a year specially made for persons with diabetes. Alberta, a sixty-two-year-old with diabetes, and her husband (mentioned earlier) are another couple who are "Mexican Snowbirds" with MediCal. They state that they hardly ever go to the doctor while they are in Mexico and that they bring everything she needs from the United States. If they do need medication, they pay for it out of their own pocket.

Going to the public health clinic in Mexico once a month to see a doctor and maybe receive diabetes medications is much different than the experience of those who receive MediCal. MediCal covers all medical expenses and even free shoes. One program offers ease of travel internationally, the other frustration. If a Mexican who had MediCal got sick, why would he or she choose to go to the public health clinic of Ario de Rayon?

5.4.3.2.2 What the "Haves" Do

The other comparison to make is between the "better off" non-migrants and migrants. I write "better off" in quotations to emphasize that although this group is in a better position than the Mexican public health system utilizers, they are not what we would consider "better off" by American standards. The non-migrants usually worked for a private company or the state and retire with the benefits of their employers. This group continues to see their doctors at IMSS or ISSSTE when they stop working and receive medical care and pharmaceuticals at little to no cost.

The clinics at IMSS and ISSSTE are often crowded, and patients need to wait days before getting an appointment to see a doctor, but for the "better offs" this is not an issue because they have the economic resources to see doctors privately and go to private laboratories if they do not have time to wait. Gloria is a seventy-one-year-old, married, non-migrant female with diabetes who goes to the diabetes clinic at the local IMSS hospital. She states that the good thing about IMSS is she does not have to pay out of pocket for her medications or doctor visits, but the bad side is that this benefit is accompanied by the inconvenience of long waits. She states that sometimes she gets frustrated with IMSS and pays out of pocket to receive private services. Margarita, a fifty-seven-year-old, non-migrant, female with diabetes is another example of someone with options. She states that when she cannot get in to see a doctor at IMSS she goes to the public health clinic.

There is also a group of migrants who would be classified as "Returning Retirees" who choose to return to their places of origin to spend their golden years who are also able to adopt the same type of strategy as the "better off" non-migrants. This group does not have the retirement benefit of IMSS or ISSSTE, but are able to pay a yearly premium to participate in these programs and receive the same benefits. Furthermore, these migrants have the economic means to pay a private doctor or to purchase medication.

Ramona is a seventy-one-year-old married female with diabetes. She and her husband lived in the United States for eleven years. They left the United States because Ramona's mother was ill and needed someone to take care of her and afterwards decided to stay in Mexico. She pays a yearly premium to utilize the ISSSTE system and as a

result, does not pay out of pocket for medications or routine doctor visits. She reports, however, that when she needs to see a specialist, she sees a private-practice physician.

In terms of healthcare utilization, there is an important distinction between non-migrating and migrating poor and between poor and "better off" persons with diabetes in these communities. Migrating poor are sometimes able to access public health services in the United States that provide more extensive services than the non-migrating poor. The "better off" persons with diabetes, regardless of migration status are able to exert more control over their health care through the greater freedom of options that are made possible through their better economic standing.

5.4.3.3 Economics

5.4.3.3.1 Migration Income

Many migrants from Mexico spend years in the United States working with the hopes of someday retiring in their dream home in Mexico and living off pensions or monies saved over the years. For many, as described in the section on "migrant typology," this is possible. The income that these "returners" earned provides a standard of living that allows them to better manage their illness. They are able to pay for private doctors and medications on their own, whereas some of their non-migrant counterparts need to rely on the public health clinic and sometimes go without medication because they are unable to pay for it out of pocket.

Pensions from the United States, on the other hand, allow the retiring migrant to save a reserve income that provides an economic buffer that non-migrants do not have.

Pablo, a sixty-two-year-old male with diabetes mentioned earlier, returned to Mexico after working in the United States for more than twenty years and has a pension. He works in Mexico part-time as a repairman to make extra money. He states that when he is sick, he simply does not go to work. Having his pension gives him flexibility he would not otherwise have. He states that when he needs medication or to go to a private doctor, he uses the money from his pension.

Julia, who was also mentioned earlier, returned to Mexico after her husband became ill, and they did not have access to medical care. She receives care for her diabetes in a private clinic and pays out of pocket for her medications with monies they saved from working in the United States. She states that she and her husband could have returned to the United States after his illness, but "it's just cheaper to live here (Mexico) when you are old and do not have to work."

5.4.3.3.2 Healthcare Remittances

Remittances from the United States to Mexican households is said to be billions of dollar each year (Lozano 1993). Much of the money that is sent is used to build dream houses and to pay for day-to-day expenses of the home or family business. Over the course of my investigation it became apparent that remittances also play an important function for the care of diabetes in Ario de Rayon and El Llano.

Many Mexicans with diabetes living in these communities have family (primarily children) who live in the United States. Although children are unable to provide day-to-day assistance for their parents with diabetes, they do provide much needed economic

assistance through sending money and medical supplies. This gives the Mexicans with diabetes who have this resource an advantage over their counterparts who do not.

Lucila is a ninety-year-old widow who has had diabetes for forty years. Her children and siblings all live in the United States, which is a drawback with respect to assistance in the home or when she is ill, but a benefit economically. Every month she receives remittances from her family to pay for her medicines, doctors' visits, and an assistant to help her around the house. She is one of the lucky few in these towns who can say that she has never had a time when she has had to go without medications.

Juliana, a forty-five-year-old, and Albertina, a forty-eight-year-old, both with diabetes, have sons who live in the United States and send money every month to help pay for diabetes medications and doctors visits. The income that is received from these family members in the United States insures that family members with diabetes will be able to comply with the strict regime of their illness.

An additional remittance that also benefits those with diabetes is the medical technology that is either unavailable or too expensive to buy in Mexico that is sent from the United States. An important instrument that is taken for granted in the United States is the in home blood sugar level checking devises otherwise known as the glucometer. This is an important part of the daily routine of persons with diabetes in the United States and is covered by most insurance carriers. In Ario de Rayon and El Llano, a glucometer is not a commodity easily to come by. The local public health center does not distribute the devices and those with diabetes need to pay out of pocket to get one. As a result, most of the residents who I spoke to with diabetes get their blood sugar checked once a month or even less often. The persons with diabetes that have family who live in the United States

have an advantage due to the fact many of them received a glucometer and are sent stripes once every couple of months. This enables community members with diabetes who have this resource to monitor their blood sugar levels daily which is pivotal to the disease management.

5.4.4 Timing of Illness

An important factor to consider when looking at the relationship between migration and diabetes health is the timing of the actual illness. In every case that I had interviewed, the subject developed diabetes after returning to Mexico and living there for sometime. Never had the diagnosis of diabetes been the precipitant to returning to Mexico, but rather an acute illness, the care of sick family members, or simply the subject did not like it in the United States and wanted to return home. In sum, in this study Mexicans who return to their communities of origin in Mexico from the United States are healthy prior to the move and become sick after the fact.

5.5 Conclusions

This chapter illustrates how complex the relationship between migration and diabetes health. People with diabetes in these two communities adopt different strategies depending on which resources are available to them. There is not one way that serves all needs. People do what they need to do based on the resources they have. To suggest that older Mexicans return to Mexico when they get sick is over simplifying the relationship between health and migration. The most likely explanation is that for those you return there are multiple factors on both sides of the border that determine if one will return or

not. This chapter opened the door to understanding what the process may look like, but much more research is indicated.

Chapter 6: Putting the Pieces Together—Why Go Back?

6.1 Introduction

Rather than tracking the health and mortality advantage that is known to exist for Mexicans living in this country, the purpose of this study was to develop a framework for the incentive to return to Mexico from the United States for older Mexicans who have diabetes. This project speculates on why someone with a chronic disease might return to his or her country of origin. For older Mexicans with diabetes, this study did not give overwhelming reason to return, but instead demonstrated why this population might be better off just staying put in the United States.

In the quantitative analysis, having family, healthcare, and economic resources makes no difference in the United States and not having them may put an older Mexican with diabetes at a disadvantage in Mexico. I took this investigation a step further by conducting in-depth interviews in two migrant towns in Michoacán, Mexico, and found that the only incentive to return is if the migrant has economic resources and health. When these factors are taken together, for the vast majority of Mexicans with diabetes who live in the United States and are considering returning to Mexico when they become sick, they should think twice.

6.2 Major Findings

6.2.1 United States

My study demonstrates very little observable benefit for Mexicans (immigrant or U.S.-born) living in the United States in terms of diabetes health and resource access. In

fact, Mexican immigrants with diabetes are at a disadvantage economically, which accounts for their poorer health and mortality profile. This study suggests that resources in general do little to explain the Mexican health advantage with respect to diabetes in this country at least.

Much like the results of Angel, Buckley, and Finch (2001), this study finds that family resources do little to benefit older Mexicans with diabetes in alleviating the negative effects of the disease. These findings suggest that simply having family around to give you a hand when in need is not enough. There is probably an economic component to family assistance that can offset the lack of income an individual with diabetes might have. Many older immigrants move in with loved ones when they do not have sufficient economic resources (Angel, Angel, and Markides 2000). This movement provides not only a more economical place to live, but also a more dependable source of food and monitor of economic needs associated with health than if that older person were to live alone. The relationship between health and family resources, nevertheless, is complex for this population and deserves further exploration using more exhaustive variables than in this study to really determine if there is truly a protective effect of the Mexican family in this country.

The good news from this study is that the type of insurance an older Mexican has does not make much of a difference either. Since most have Medicare in combination with something else, this federal program seems to be doing its job for this group. Although having secondary insurance is helpful, it does not matter which one has: diabetes is going to take its toll regardless. Getting into the Medicare program is a

challenge for most Mexican immigrants, but my findings suggest that, once in, they have very little incentive to leave.

Economic resources have the most to say in terms of diabetes and migration status for older Mexicans in this sample from the United States, but not in a way that is consistent with the epidemiological paradox. Older Mexicans with diabetes who are immigrants have lesser economic resources, and this lack of resources has a negative effect on their health. This is not a paradox. Other previous studies have also shown that, when viewed from a different perspective, there is no paradox related to Mexican health and mortality (Tortolero, Goff, Nichaman, Labarthe, Grunbaum, and Hanis 1997; Wei, Valdez, Mitchell, Haffner, Stern, and Hazuda 1996; Mitchell et al. 1996), suggesting perhaps that the "paradox" is highly dependent on how we look at it.

6.2.2 Mexico

Families in Mexico are overburdened with the demands of survival. Most adult members are working full-time just to produce enough income to put food on the table and to keep the lights on. For this reason, one or two members migrate to the United States to diversify their income just to try to get ahead (Massey et. al. 1994). Having a sick family member to care for means a strain on the economic system in place, and for that reason most of the Mexicans with diabetes I interviewed did not want to burden their family members with their health care. Furthermore, the statistical analysis showed no protective effect of marital status or family support, but without either, older Mexicans with diabetes are worse off. Taking both the qualitative and quantitative results together, one can see that families in Mexico are probably just getting by and can keep their family

members afloat when they are sick, will keep them from drowning, but cannot pull them out of the water.

The healthcare system in Mexico is work-based, and the best benefits come to those who have worked for many years for the same company, which means no migration to the United States. Migrants who are in a good economic position and are able to pay privately can also achieve this advantage. The alternative is public health care from the United States or the public health system in Mexico. Mexicans who are forced into the Mexican alternative are the ones who are struggling to treat their illness and are usually short of medications and food to follow the diabetes diet. If most returning migrants are unable to pay for IMSS, ISSSTE, or a private doctor, then they are going to be forced to deal with the public healthcare system, which ultimately places them at a disadvantage with respect to the health.

The strongest argument for return migration from the qualitative study is quality of life and lower cost of living in Mexico (i.e. economics). Mexicans who return to Mexico after spending years in Mexico go back because they can extend their dollars by living in a place where the cost of living is lower than in the United States. Most often the migrants who returned to Mexico for economic reasons did not have diabetes and developed the disease later. Mexicans who were successful in the United States and are able to survive independent of family that live in Mexico are able to return and lead a quality of life that may be better than in this country. Migrants who do not have economic resources in the United States are most likely going to put themselves in a worse position economically, have less access to healthcare services, and become

burdens to their family members. All of which suggests disincentive to return to Mexico for those without economic resources.

6.3 Limitations

6.3.1 Quantitative Design

Trying to work with two different datasets from two different countries and by two different groups of investigators was the most challenging aspect of this project. Variables are not exactly alike, and I was forced to pick and choose in order to make the analysis comparable. Comparative work between Mexicans living in the United States and Mexico is an essential direction to take if we are to come close to an understanding of the epidemiological paradox, but based on the current availability of data, this work and projects that follow are restricted to the types of variables included on each survey instrument.

Due to restrictions in variable comparability, my analysis was extremely limited in which resources I could use. Variables such as economic assistance given by family or values of subjects' property could have added to the analysis and my ability to speculate on motivations for migration. Unfortunately, because many variables such as these were not on either survey, I was unable to use them and thus had to constrain the depth of my analysis.

Another major shortcoming of my project is the age range (or lack thereof) of the Hispanic EPESE data. The youngest subject in this dataset in the wave that I worked with was 70 years. Although they are at the end of the life course and thus allow us to observe

the potential lifetime effects of resource access, this limitation still restricts the interpretive possibilities for different age groups.

The type of statistical procedures I was able to perform also restricted my analysis. In an ideal situation, I would have preferred working with longitudinal data that allows the determination of the effects of resource access over times; however, the MHAS data is only available for two waves. This defect dictated that I run only simple logistic regression, thus restricting my capacity for interpretation.

The most significant weakness of this analysis is the lack of migration-specific questions, as they relate to health. Neither of the datasets contains complete information with respect to frequency of returns to Mexico, reason for returns, or hypothetical case scenarios about what one might do if an older Mexican with diabetes were to become sick or unable to care for themselves. The failure to include such questions forces us to speculate on how these relationships may work and leaves us no closer to explaining the epidemiological paradox (Paloni and Morenoff 2003). Furthermore, there is very limited information on documentation status or strategies that may be adopted in accessing resources, particularly in the United States. These factors may also contribute to a greater understanding of how we might be taking inaccurate counts of deaths of Mexicans (see Patel et. al. 2004).

Finally, researchers must always use caution when interpreting the results of self-reported health conditions, such as in this case with diabetes. Subjects were asked if they were ever told by a physician that they had diabetes. This variable is conditioned by the selectivity of visiting a doctor to be diagnosed and may potentially be under-reported as a result. The ideal would be actually taking blood samples at the time of the interview;

however, this procedure would be costly and, therefore, we are forced to rely on self-reporting.

6.3.2 Qualitative Design

Trying to plan field work before getting into the field has shortcomings that emerged in this study. You spend many hours thinking of brilliant ideas that do not even come close to panning out when you are actually in the field. The methods used (i.e. in-depth interviews) and the location (Zamora, Michoacán) were the right choices for the research questions that I had, but the weaknesses of this study were primary with respect to the type of questions I asked and the lack of qualitative information from the United States.

Coming up with interview questions that are going to effectively address the key themes of my research prior to being in the field was difficult. I made a lot of assumptions about how people were going to answer beforehand, and when I actually began to ask the questions, I realized many were irrelevant. There were others questions I should have asked but could not because I was already in the field using the instrument that had been approved by the IRB. Visiting the site and testing some of the questions out prior to taking on my full dissertation project would have been beneficial.

The qualitative information that I collected in Michoacán complemented the quantitative analysis from Mexico in that it gave insight into why resources may or may not be useful in protecting the health of older Mexicans with diabetes. In the United States there was little to no effect of the resource variables on the relationship between diabetes status in the quantitative analysis. Having the qualitative supplement for the

results in the United States as well would have given further insight into why there was little to no effect of these resource variables.

One final limitation that I would like to comment on is the lack of ability to generalize the findings from this study on all migrant communities in Mexico. Just looking at two communities, I realized that there is a lot of variability depending on the age of the migration tradition in that town. El Llano was a firmly established migrant town, whereas Ario de Rayon was still developing. These differences are just two examples of differences that may exist among other migrant towns in Mexico and why future research should include other sites.

6.4 Recommendations for Future Research

This study is one of the first of its kind to take on the epidemiological paradox from both the United States and Mexico. Although this study has given some insight into the relationship between health and migration, we still have a long way to go. The direction that I believe research in this area should head is primarily with respect to the utilization of qualitative methods to design better quantitative instruments. Researchers need to break out of their quantitative shells, at least temporarily, and spend some time trying to understand the complexities of migration that exist between Mexico and the United States through qualitative research. The major shortcoming of this project and others in the past is that they attempt to explain the health and mortality advantage that Mexicans living in this country possess with data that is sparse in Mexican-descent representation and do not ask questions that address the migration experience

specifically. Qualitative interviews could give depth to future quantitative questions that address migration and health among older Mexicans.

In addition to more integration of quantitative and qualitative methods, our approach to the epidemiological paradox needs to change, as Paloni and Morenoff (2001) argue. We have spent a great deal of time and effort describing the trend and have offered little to explain it. My study and a few others (Patel et. al. 2004, for one) have made some of the only attempts to describe why. Future research needs to utilize data on health and migration that is increasingly becoming available in Mexico. In addition, spending time looking at individual diseases and their relation to mortality, as I did with diabetes, could give insights into how the experiences of Mexicans in this country may be the same or different from Anglo-white Americans.

My final comment on future research has to do with the way we collect information about mortality in Mexican immigrants in the United States. We need to do a better job at understanding what type of strategies they may use to survive in the United States and how those strategies may be influencing their mortality numbers, for example, the use of false identification and other similar attempts at acquiring services or employment that they would otherwise be unable to access. Additionally, we need to improve our methods for documenting the day-to-day strategies Mexicans of all ages use to care for health not only in the United State, but in Mexico as well.

It is unlikely that there is one simple answer to the "epidemiological paradox." The answer probably lies within a few possibilities. In order to truly understand the "why's" and "how's" of this phenomenon, we need to change our approach and move beyond the work that has already been done. As the Mexican-origin population in this

country grows in size, our style of research must become more creative in applying existing tools in new ways.

APPENDIX A: Subject Descriptive Statistics

Un-weighted Variable Frequency Distribution for EPESE and MHAS 70+††

	EPESE (n =1876)		MHAS (n = 2978)	
	Survivors	**Deceased**	**Survivors**	**Deceased**
n	1652	224	2678	300
Persons with Diabetes	418(86.0%)	68(14.0%)	409(84.7%)	74(15.3%)
Persons without Diabetes	1234(88.8%)	156(11.2%)	2189(90.8%)	221(9.17%)
Age				
70- 75	837(94.2%)	52(5.85%)	1397(52.2%)	99(33.0%)
76-80	436(88.6%)	56(11.4%)	762(28.5%)	72(24.0%)
80+	379(76.6%)	116(23.4%)	519(19.4%)	129(43.0%)
Male	642(84.2%)	120(15.8%)	1492(89.9%)	168(10.1%)
Female	1010(90.7%)	104(9.34%)	1186(90.0%)	132(10.0%)
Years of Education				
6 or Less	1238(87.9%)	170(12.1%)	2351(87.8%)	260(86.7%)
7-11 Years	261(90.3%)	28(9.69%)	212(7.9%)	22(7.3%)
12 Years	105(87.5%)	15(12.5%)	28(1.1%)	5(1.7%)
More than 12 Years	48(81.4%)	11(18.6%)	87(3.3%)	13(4.33%)

APPENDIX B: Qualitative Instrument

1. Sex
   __Male
   __Female

2. Age
   ____

3. Location of Interview

City_____

State_____

4. Level of Education
   ____Primary School

   ____Secondary

   ____Some University

   ____University Graduate

Theme 1. Diabetic Health

First, I am going to ask you some questions about your health and diabetes. Please as specific and as complete as possible.

5. When were you diagnosed with diabetes?
6. Do you have Type 1 or Type 2?
7. What medicines do you take (and how often) for your diabetes?
8. How often do you check your blood sugar?
9. How often do you see a doctor for your diabetes?
10. When I say that your diabetes is under control, what does that mean to you?
11. Do you consider your diabetes under control?
12. Other than diabetes, do you have any other health problems?
    If so, what are they?

Theme 2. Access to Diabetic Care in the United States and Mexico

The next set of questions are with respect to resource access here in Mexico and while you were in the United States.

13. Did you have insurance or other health care coverage while you were in the United States?
    If "YES", what type?
14. How did you pay for your medical treatment for your diabetes while you were there?

15. What were some of the difficulties in the United States you faced in receiving care or assistance when you were ill with your diabetes?
16. How do you pay for your diabetic treatment (doctor visits, medication and other diabetes related expenses) here in Mexico?
17. Is it easier for you to get medical care for your diabetes here in Mexico than in the United States? If so, in what ways?

18. Where do you receive medical care for your diabetes here in Mexico?
19. Are there private clinics or providers of health care where you or others can receive treatment from?

What type of services do they provide?

Theme 3. Experience in the United States

As I have mentioned earlier one of the primary requirements of this study is that you had migrated to the United States previously. The next set of questions therefore is with respect to your experiences in the United States.

20. How long did you spend in the Unites States?
21. Did you work in the Unites States?
    If "YES", for how long and what type of work?
    If "NO" how did you support yourself?
22. Do you have family members that live in the United States?
    If "YES", whom?
23. Did they help you go to the United States to live?
24. Other than relocation, what other types of things did they help you with (if any)?

Theme 4. Migration and treatment for diabetes

The next set of questions is with respect to you health and your experiences in the United States.

25. Why did you leave the United States?
26. Did your health status affect your decision in returning to Mexico?
    If "YES", in what ways?
27. Have you or have you observed people who returned from the United States to Mexico because they could not access diabetic care there?
28. If so, what resources for their diabetes do people have the most difficulty accessing in the United States?
29. What reasons do you think cause people to return to Mexico after living in the United States for many years?
30. How do people from Mexico who do not have insurance pay for diabetic treatment or medicine in the United States?

Theme 5. Resource Utilization

This final group of questions is in regards to resources that are available to you and how do you access them to care for your health.

31. Do you have family who can help you when you become ill with your diabetes?
32. Do you think it is necessary to have family nearby in the event you have a problem with your diabetes?

Why or why not?

33. Other than family, who helps you care for your diabetes?

34. What type of assistance do they provide?
35. Have you ever had a moment when you did not have enough money to pay for your diabetic medicines?

If "YES", when you do not have enough money to pay for your diabetic medicines what did you do?

36. Do you have people that you can rely on financially to help cover the cost of your diabetic medicines?

If "YES", whom?

37. What type of governmental or privates services are available to you to help cover the cost of caring for your diabetes?
38. With respect to government and private health care services, do feel that there are enough services to take care of you diabetes?

If "NO" or "YES", why?

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